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THE UNIVERSITY OF ALBERTA

THE EXPERIENCE OF BECOMING A PILOT: AN INTERPRETATION

by



Neil Robert Winther.

A THESIS

SUBMITTED TO THE FACULTY OF GRADUATE STUDIES AND RESEARCH
IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE
OF DOCTOR OF PHILOSOPHY

DEPARTMENT OF SECONDARY EDUCATION

EDMONTON, ALBERTA

SPRING 1986

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Neil R. Winther

PERMANENT ADDRESS:

R.R.1 Anola, Manitoba
Canada ROE OAO

Dated:

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The undersigned certify that they have read, and
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THE EXPERIENCE OF BECOMING A PILOT: AN INTERPRETATION
submitted by Neil Robert Winther in partial fulfillment
of the requirements for the degree of Doctor of Philosophy
in Education.

L. Bunch
.....
Supervisor

K. G. Jackman
.....

J. G. G. G. G.
.....

J. G. G. G.
.....

J. G. G. G.
.....

H. B. B.
.....
External

Date... *12/16/85*

DEDICATED

To

My Mother and Father

Harry and Frances

Winther

ABSTRACT

The present research attempts to describe the experience of becoming a pilot as described by a student pilot progressing through private pilot flight training. In contrast to many studies which view flight training as the acquisition of a series of skills which can be tested and measured, this study perceives flying as a way of "being." The study is then context bound, a study of situation rather than variables and an attempt to see the experience of becoming a pilot as pilots see it.

A situational study was carried out with a student pilot forming the central focus. However, dozens of other pilots and academics contributed to the research. Data were collected in the form of detailed field notes, a daily journal and tape recorded interviews which were later transcribed. More than 100 interviews were conducted over the course of a two year period.

The first chapter describes the method used. Chapter II outlines the preconceptions student pilots bring with them to their first lesson and attempts to trace some of the origins of this cultural "baggage." Chapter III discusses the "text", or the sources of information the pilot has at hand to acquire an understanding of flying. Chapter IV looks at the relationship that develops between the pilot and the aircraft with a special emphasis on the impact of technology.

A study of flying would not be complete without an examination of the sky and the attraction pilots have for open spaces. Space awareness in all its dimensions is described in Chapter VI. Chapter VII looks at the visual, tactile and auditory sensations a pilot experiences when flying.

A major factor in flying is time and the way the pilot experiences its flow. The experience of clock time and the inner sense of time are explored in Chapter VIII. The pilot's sense of individual volition including life or death decisions is portrayed in Chapter IX.

Chapter X describes the personal and communal rewards of flying and Chapter XI will leave the reader with some special flying memories. The study is concluded with the researcher's reflections in Chapter XII.

PREFACE

This dissertation is the culmination of many years of curiosity, excitement, questioning, and frustration. I say many years because although I formally pursued this topic for two years, I have been contemplating the questions for over a decade.

As I reflect back over the two years since I conceived this project, I realize how much the fellow pilots and academics of this study have taught me. It is their thoughts, their descriptions, their expressions, their images that have come together to form this portrait of the experience of becoming a pilot.

The experience of writing this dissertation has not always been easy, and had it not been for the enthusiastic support of the many pilots, friends, and colleagues, the project would never have been completed. As you move through the text you will encounter many interesting flying personalities. In most cases I cited the primary sources, however, in some cases I withheld surnames to protect my informants.

My intent in this study was to develop a common-sense display of ideas that would inform both pilots and non-pilots of the experience of becoming a pilot. For this reason I have written this dissertation in a relaxed fashion with a minimum of jargon and technical terminology. For those who wish further information on data collection

and analysis, an extensive appendix has been attached. Hopefully, the text will flow from one topic to another with a minimum amount of disruption. Please sit back, relax, and enjoy the journey.

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I would also like to thank my external examiner, Dr. Robert Bryce, for his participation in my research.

Unfortunately, I am unable to release the true identity of Andrea; however, my deepest appreciation goes to her for sharing her experience with me.

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CHAPTER 1

UNDERSTANDING THE EXPERIENCE OF BECOMING A PILOT

INTRODUCTION

The following is a description of the experience of becoming a pilot as experienced and described by pilots. If you wish to fully profit from this study you may have to set aside your usual mode of perception in order to be receptive to some aspects of the universe that exist outside your everyday reality. You may have to turn off the "internal dialogue" (Castaneda, 1971, p.263) that causes you to repeat and perpetuate your ordinary universe. If you are most comfortable with a scientific perspective and are accustomed to labelling, classifying, and reducing the universe to discrete parts, this "flight" may not be for you.

Perhaps I should clarify one issue before I proceed any further: this study does not involve airline travel. However, airline travel does serve as an excellent example of a phenomenon that exists in our Western culture; that is, the tendency we have to reduce our everyday experiences to less than they really are. Think of it for a moment: when you board an airliner you walk down a carpeted hallway into a carefully appointed lounge. The faces of the stewardesses look familiar, you have seen them before in restaurants. Their job is to make the experience of flying

appear so ordinary that you begin to think you are not flying at all. Airline travel is a staged event bent on convincing you that you have never really left the ground (Bauer, 1980).

The pilot in command of a light aircraft knows when he/she has left the ground and is also well aware of who is responsible for returning the aircraft and passengers safely to the earth. Pilots are solely responsible for their own destiny.

What is it like to be that person sitting behind the sea of gauges responding to a multitude of sensations as the craft rolls down the runway? What is going through the pilot's mind on that first solo flight? Is flying merely driving a machine through the air or is it an art form? Is flying addictive? Do pilots view the world in a different way from those who keep their feet planted firmly on the ground? How could I find the answers to these and many other questions? My task was, therefore, to find a way to approach this phenomenon, gather new insights and develop a means of displaying ideas in a way that made sense to others.

The Problem with Aviation Research

In attempting to explain some of the fundamental issues and concerns that affect pilots, researchers have ignored the fact that the average pilot cannot understand the jargon used to describe their findings. The usefulness

of research becomes limited when only a select group of academics can make sense of it. The majority of aviation research focuses on technical explanations of flight, primarily with a military application. Flying has traditionally been viewed as a science rather than an art; a technique rather than an experience. The proliferation of counterintuitive methods employed in aviation research has resulted in studies that are far removed from the everyday world of flying. Thus my first objective was to design a study that would be accessible to everyone. Knowledge is meant to be shared.

Macoby (1976) claimed that traditional aviation researchers suffered from "an undeveloped heart." Bauer (1980) went further to say that many of the writers exhibited "diminished capacities for compassion and feeling and a detachment from emotions" (p. 145). How then can one "write with heart" and at the same time be sure to present an accurate portrayal of the experience? Suransky (1980) suggested that the answer was "description - clear, vivid, faithful descriptions of the experiences, actors, of words, of phenomena are central to the understanding" (p. 36).

Looking at Aviation Research in a New Light

Had I chosen to follow a traditional experimental design the structure of the research method would have become the prime focus of the study. The resulting

display of information would probably have resembled the studies Barritt (1983) spoke of:

Articles which ought to be interesting, which had interesting sounding titles, are not what I had hoped. These articles are full of methodological caution, measurement and statistical analysis. The juice is gone from life in the name of caution and precision. (p. 4)

This concern is further supported by Phillips (1971):

We simply cannot afford to continue to engage in the same kinds of sterile, unproductive, unimaginative investigations which have long characterized most . . . research. (p. 175)

In most traditional aviation research the investigator has remained removed from the subjects and every precaution is taken to avoid contamination. Van Manen (1983) cautioned against this sterile approach to conducting research:

Validity means true to life and you're not going to be true to life by staying away from it. You have to be able to get into life yourself to be able to speak to it. (p. 12)

The Origin of the Method

It should be evident by this time that the method/approach that I chose fell into the "qualitative research category." Having previously engaged in this form of research (Winther, 1983) I was aware of the standard criticisms levied by the positivistic school of thought and the general reluctance of some scholars to relinquish the old set of assumptions that previously defined their range of research possibilities (Kuhn, 1970). Fortunately the environment I worked in encouraged creative research and

subsequently I was given the opportunity to display my ideas in the manner that seemed most appropriate. As Johns (1979) so aptly put it:

What emerges is the rich and subjective qualities of data which exchange trust in quantity for reliance on quality. (p. 32)

The research methods used to complete this study were best described by Denzin (1978). The term he used was "triangulation" which refers to the "combination of methodologies in the study of the same phenomenon" (p. 291). Coincidentally, the origin of the triangulation metaphor can be traced to navigation or the use of a number of reference points to locate one's exact position (Smith, 1975, p. 273). The researcher is thus following the premise that multiple perspectives will yield greater accuracy in the same way that a pilot reasons that several landmarks are necessary to verify his/her position. As Jick (1979) argued:

More than one method should be used in the validation process to ensure that the variance reflected that of the trait and not of the method. (p. 603)

My background in quantitative research methods made me realize that data must be collected in an orderly manner, that the sources of information must be carefully accounted for and that a scheme for analyzing complex data would eventually need to be developed. In other words data collection cannot be left to chance. The "system" I used to gather information was fully as sophisticated as research

methods which might emerge from the positivistic paradigms. My contention was that adopting a single research strategy might limit the boundaries of my "research landscape."

Thomas (1979) made the following insightful comments supporting the notion that we should not be overly anxious to accept only traditional scientific research designs:

We must rely on our scientists to help us find the way through the near distance, but for the longer stretch we are dependent on the poets. (p. 87)

The present research blended and integrated a variety of data and methods. I did not force a mixture of methods, the approaches I used moved in a natural harmony.

The central focus of my research approach can be traced to coursework and readings in ethnography, ethnomethodology and phenomenology. Van Manen (1978) explained that these approaches have many elements in common:

Ethnography, ethnomethodology, analytic sociology, constitutive phenomenology all wish to treat ordinary social intercourse as a feature of the life-world. The attempt is to break through the surface of everyday utterances, actions and interactions to the structures which are embedded on deeper levels. (p. 47)

In spite of the shared interests these methods hold, they all provide unique perspectives of the same experience.

An ethnographer attempting to describe the experience of becoming a pilot might ask, "what is it that one must know to be accepted as a member of the flying community?" The ethnographer seeks to comprehend his subject's world view through the actions and words he/she observes. How do student pilots make sense of their everyday flight training

experiences? Flight instructors may perceive student pilots as quick or slow learners, ambitious or lazy, however, the student pilots may make very different kinds of distinctions.

✓ An ethnomethodologist would attempt to illustrate how taken-for-granted "rules" lie at the basis of the everyday conversations and interactions in which pilots engage. For example, this approach was used to show how flight instructors make certain demands of student pilots, assuming certain competencies which may not exist.

Ethnomethodology is a form of ethnography, but it asks its own kinds of questions about the structuring activities of people in social situations. Particularly it focuses on the "rule use" or "members' methods" for making those social activities "visibly-rational-and-reportable-for-all-practical-purposes." (van Manen, 1978, p. 53)

The most fundamental rule of phenomenological research is to go "to the things themselves" (Husserl, 1927). Phenomenologists take the experiences of the ordinary everyday life world seriously. In the present study I attempted to come to a deeper understanding of the experience of becoming a pilot, therefore, it was essential to approach pilots themselves and explore their descriptions of the experience of flight. As much as possible, I attempted to use the authentic language of the everyday world of flying in my descriptions of the pilot's experience. Additionally, the thematic analysis which eventually comprised the body of the thesis was consistent with the phenomenological approach. Beekman (1983) explains:

Accurate description is the first task in a phenomenological study. After description follows the search for themes which represent the significant meanings for subjects. (p. 7)

The multiple method/approach research strategy may not be suitable for all research purposes, however, it worked well for me. There is little doubt that it would be next to impossible to replicate this study. Should replication be a requirement, purity of method would have to be encouraged from the outset of the study.

Sources of Information

The present research is a study of the experience of becoming a pilot as described by pilots. I have been a pilot and aircraft owner myself for over a decade and thus was able to bring many ideas to the study in the form of personal recollections of a thousand hours of flying. At the same time my involvement in aviation gave me ready access to other groups of pilots. This study relied heavily on their lived experiences.

One source of information was Andrea, a student pilot whom I followed through an entire private pilot flight training program. I started interviewing Andrea before her first flying lesson and continued these interviews until the completion of her private pilot licence. The descriptions of Andrea's progress will serve as a pathway for the reader to follow on the journey that winds itself through the pilot's world. My original rationale for following a student pilot was that if "becoming" a pilot was a linear progression (as

I had perceived at the outset of the study), perhaps I could document the stages of "becoming." Using Andrea as a focal point I expanded outward seeking information from a broad base in the aviation community.

I use the term community because in the process of completing this study I received overwhelming support from other pilots. Not a single pilot refused to be interviewed. I received excellent cooperation from flight instructors, commercial air carriers, insurance companies, aircraft salespeople, professional pilot organizations, air traffic controllers, and officials of Transport Canada. Pilots seem to welcome the opportunity to talk about flying.

Early in the study I realized that pilots and instructors who were involved in the day to day "bumps and grinds" of flying had a tremendous wealth of information from which other pilots could benefit. Traditional research has neglected to access "grass roots" information.

A series of interviews were conducted with respected scholars in an effort to verify my methodology. These discussions were invaluable and served to reinforce my efforts. Additionally, material from a great number of books and journals was integrated into the body of the thesis. Most of the literature I have been able to relate to the study came from the poets rather than the scientists.

Data Collection Techniques

In-Person Tape Recorded Interviews

Forty-nine interviews were conducted with Andrea (see Appendix 1). The interviews were rich in detail and provided the information used as the focal point of this study. They were conducted at a variety of locations including her place of work, the flying club, a lounge that overlooked the airport and in local restaurants. My prime concern was to interview Andrea in a location where she felt relaxed and at the same time was easily accessible. In addition I conducted a total of forty-five interviews with thirty-five other pilots (some were interviewed four or five times over the two year period; see Appendix 2). Wax (1952) raised an interesting question concerning the researcher's need to give potential interviewees some plausible rationale for cooperating:

"Why should anybody in this group bother to talk to me? Why should this man take time out from his work, gambling, or pleasant loafing to answer my questions?" I suggest that as the field worker discovers the correct answers he will improve not only his technique in obtaining information but also his ability to evaluate it. I suggest, moreover, that the correct answers to these questions will tend to show that whether an informant likes, hates, or just doesn't give a hoot about the field worker, he will talk because he and the field worker are making an exchange and are consciously or unconsciously giving each other something they both desire or need. (p. 34)

In other words, one must firstly give the perspective interviewee a good reason to cooperate (after getting past the "gate keepers" to make the request in the first place), and secondly, to conduct the interview in an orderly and

respectful manner leaving the interviewee with a feeling of time well spent. The researcher must remember that each person interviewed may not be an ideal subject, however, they may well be a "bridge" to another subject. Spradley (1972) and Golec (1982) have clearly outlined logical progressions for conducting field research starting from selecting an appropriate site, ending with data analysis. Unfortunately, related literature can only offer suggestions as to the reasonable order in which one might conduct field research; learning how to conduct meaningful interviews is an art that must be learned through experience.

A final set of interviews was completed with sixteen scholars (see Appendix 3). These interviews occurred over approximately a four year period and today I view the transcriptions of these conversations as some of my most valuable resources. The interesting thing about them is that as I read the text I find I really am back in the bar talking flying with Michael Apple, back at the Faculty Club discussing my method with Margaret Hunsberger, back at the restaurant with Ton Beekman. If I concentrate I can hear their voices and see their gestures. The text comes alive.

The interviews were transcribed on an ongoing basis in order to refine questioning techniques. Approximately one thousand pages of type-written dialogue comprised the raw material of this study (see Appendix 4 for a sample interview). Although this method requires a great deal of time

and involves considerable expense, the data is eventually displayed in a form that is easy to work with.

In-Flight Interviews

Andrea and I regularly flew together. This gave me an opportunity to observe her reactions to situations I had also encountered. In such situations I was able to compare her perceptions to mine. I made several attempts to record conversations while in flight. This was moderately successful, however, technically it was difficult to set up. I would like to explore this possibility more completely in the future as I think an unobtrusive means of recording in-flight dialogue particularly between the instructor and the student could reveal some further insights into the nature of flight instruction.

Telephone Conversations

In addition to the many in-person conversations I held, many telephone conversations were conducted. Comments from these conversations were recorded in my field notes and proved useful for filling in the gaps between meetings with Andrea. In other instances people had the time to talk to me over the telephone but were too busy to arrange an in-person interview. Some informants feel more comfortable dealing with issues over the telephone rather than being face to face with an interviewer. It should be noted that when attempting to gain entree to some new sites (Transport Canada) I had greater success appearing in person.

Field Notes

When I conducted interviews I always took my field note binder along. I recorded the date, time, place and other details that might be important to make sense of my data later on. Field notes are important as a means of filling in details that cannot be recalled by reading the transcripts and become crucial if the tape recorder ever breaks down. (It is wise to bring a spare tape recorder along.) My field notes also contain the business cards of some of the interviewees, newspaper clippings and other information that might be helpful for future reference.

Because I wanted to use my field notes as an integral part of the data analysis I made allowances in the layout of the notes to facilitate this. My notes are designed to follow a four column system, each column occupying half a page (see Appendix 5 for an example of field notes). Working from left to right the first column contains my description of the interview. This column documents the content of the interview. After the interview I completed the next column which is my interpretation of what insights were gained from the person I just spoke to. I noted if I thought this person would be useful for future interviews or if the interview was of little value. The third column which was my reflections column, may not have been used for some time. In some instances the content of the interview did not seem significant at the time it was conducted but later on, after

subsequent interviews with other people, what was recorded started to make sense. Thus in the third column I had an opportunity to make a deeper interpretation of the material. The final column was the space provided to list the possible themes that I felt were emerging from the interview. Sometimes I felt a theme was beginning to appear immediately after the interview. For example, fear of death was a theme that appeared early in the study. The field notes allowed me to work through the data in an organized manner.

File Cards of Contacts

After an interview, whether by telephone or in-person, I filled out a file card describing the person I had just spoken to. It is interesting to note that in more traditional research the only cards students would often use contain reference material on library sources. In contrast, life-world research must look to the people involved in the phenomenon being described as the most valuable resources. My cards included information such as names, addresses, phone numbers, area of expertise, occupation and specific comments that let me know how this person might be utilized in the future.

Andrea's Journal

At the outset of the study I gave Andrea a daily journal and asked her to record the thoughts she had about flying as she went through her normal day. I was interested

to see if flying had a broad influence on her everyday routine. Shortly after she began flying she noted that she was becoming much more aware of weather conditions. She followed weather reports in more detail and as she walked the wind on her face had a new meaning. When she was driving to the airport to go flying, she found herself rehearsing the take off procedure. These kinds of comments proved useful during the data analysis.

My Journal

I completed over six hundred pages of journal entries during the course of this study. Some days I had little to say and other days I would fill pages. The journal was a way for me to plot the emergence of my own insights (a study of its own) and was structured as a kind of dialogue with self (see Appendix 6 for samples of journal entries). I carried the book with me at all times and it was interesting to review the pages and note when and where I had different inspirations (and frustrations).

Data Analysis

Data analysis occurred on an ongoing basis. When I looked through my journal it revealed that several weeks into the study I was making comments about possible themes. However, this kind of thematic emergence was occurring largely by intuition and the results of research cannot be taken seriously if intuition is the only "method" used to analyze data. The formal analysis occurred when I had all

the interviews I wished to use transcribed, my journal entries in order, my field notes in front of me, and the relevant literature sorted out. I sat looking at a stack of close to two thousand pages of information. It brought to mind a comment made by Swinton (1972) as he described an Inuit artist's perceptions of soap stone sculpture. He claimed that the artist put the stone to his ear and could "hear" the sounds of the bird, wolf or bear. The artist's task was to carve away the stone allowing the form to emerge. In a similar manner I perceived my task as one of working with the text in a thoughtful and sensitive fashion that would allow the themes to emerge in order that some new images of flying might be shared.

I conducted all the interviews and transcribed most of them. When one puts that degree of effort into collecting dialogue there is a tendency to become almost attached to it. There is that sense that this is truly my material. I read and re-read the conversations and in many instances I listened to the tapes. I could understand once again the concern in Andrea's voice as she described her fear of "screwing up" a landing in front of her peers.

The formal analysis of the text was conducted in a systematic way. The first stage involved moving through the text underlining and making notes in the margins (see Appendix 7). As Hunsberger (1983) said, "Margin writing is a conversation with the original text" (p. 27). The text

"came alive" as I re-read it and the margin writing seemed to be my way of "talking back" to the original text. In some later interviews with MacMillan (1985) I went so far as to insert my reactions to her comments directly into the transcripts before I returned them to her (see Appendix 8). The next stage was to write descriptors in the margins that seemed to capture the main ideas being portrayed in various portions of dialogue (see Appendix 9). After working through all the dialogue page by page, I collected the descriptors and attempted to group them into meaningful categories (see Appendix 10). It is important to note that the descriptors "came out of" the text rather than being imposed on the text using some predetermined structure. Five attempts were made to shape these one hundred and fifty descriptors into some form that could be used to "tell the story" (chapters) in a meaningful and comprehensible way. This effort to categorize ideas without compromising the integrity of the research was a difficult undertaking. Once the categories were formalized I was able to decide on an appropriate order for chapters and begin the writing. In a sense themes do not emerge but rather they "take shape" much like clouds do and if you look at them long enough they will give you a sensation you can put into words.

One of the greatest difficulties I encountered in writing up this study was finding the correct words. Words, as Hayakawa (1978) elaborated, are only symbols

for things and not the things themselves. No matter how detailed my description was, it always seemed incomplete. There are many aspects of flying that simply don't have parallels in ordinary existence, however, words were the only "tools" I had to work with. If I had perceived flying as a technical skill, my task would have been much simpler. In technical language the symbol and the reality tend to be well matched (Burch, 1984, p. 4). I looked to the great aviation writers and poets for further insights.

Anne Morrow Lindberg wrote many fascinating books about her flying adventures and those of her husband Charles. She made the following comments in the introduction to Antoine de Saint-Exupery's famous book Wind, Sand and Stars (1939):

One feels sometimes that the only great stories are those which are so simple that they are like empty cups for people to fill with their own experience, and drink for their own need, over and over again, through the years. The cup itself must be beautiful and well made. (p. 5)

In keeping with Lindberg's comments I hope the present thesis will be simple and yet rich in meaning. Flying, like writing is a simple act; however, the outward simplicity of both experiences should not lead the casual observer to ignore the complex background of reality from which these simple acts emerge.

The journey begins.

CHAPTER II

FLYING AS A PUBLIC DISPLAY

For centuries, the fantasy of soaring, breaking the earthly bonds and mastering the winds, has exerted so fundamental a drive that it seems somehow woven into the fabric of humanity. In art and literature, in mythology and religion, man has pondered and marvelled at - even worshipped - the phenomenon of flight. (Moolman, 1983, p. 6)

For many people the idea of flying is more than a subject for speculation and wonder. The idea of gliding like a bird intrigues many fledgling pilots. Today, aircraft are a part of our everyday landscape, however, not too long ago they were an uncommon sight in the sky. The history of powered flight spans a mere eighty years.

In today's society many people can afford flight instruction and the safety hazards that plagued the Wright brothers no longer exist. Statistics are showing that each year more and more people are taking up the sport. What is it that stimulates that student pilot to walk into the flying school for the first lesson? The following section explores this question.

Flying Perceived as a Last Frontier

If we look closely around any general aviation airport, we will surely see a few people just standing around watching whatever might be going on. They won't have any particular business there - they will just be watching. Most of these people don't fly themselves, but somehow they enjoy the ambience of the setting they have entered. (Bauer 1980, p. 17)

What is it about flying that attracts these crowds of anxious onlookers? Clarke (1984) , a pilot, gave the following insights based on her experience as a pilot, flying club employee, and an aviation insurance broker:

It is a last frontier. It is one of the very few things that people have not done, and yet, they still associate it with the guy with the goggles and the hat and the scarf you know. It is a last frontier. It is one of the very few that is left.

So why do people fly? Are they concerned about appearing to be too ordinary in a world where it is difficult to stand out in the crowd? Andrea claimed she was "looking for new challenges" and felt there would be "a great deal of satisfaction in knowing how to do it."

Many pilots have told me that they find it disconcerting to drive across the flat prairie regions when they could be flying over them at 200 miles per hour. Saint-Exupery, a French pilot who helped pioneer the airmail routes in Africa and South America, made the following observations in his book Airman's Odessey. His comments refer to passengers on an airport bus.

Now the clay of which you were shaped has dried and hardened, and naught in you will ever awaken the sleeping musician, the poet, the astronomer that possibly inhabited you in the beginning.
(1942, p. 23)

What I am suggesting is that in a society where it is becoming more and more difficult to appear special, individuals like Andrea are searching for new means of being identified as exceptional. Gwilliams, an instructor, suggested that "most people think pilots are a little bit on the special side."

The Mystique of the Bush Pilots

Harmon Helmericks (1977), a well known pioneer of Alaskan bush flying made the following comments in his book

The Last of the Bush Pilots: -

Without overdramatizing my own profession, I think it is safe to say that the bush pilot of Alaska must take his place eventually alongside the stagecoach driver, the dispatch rider, river-boatman, voyageur, and the Pony Express man as a communications pioneer in the country's history. (p.1)

Andrea grew up in the Northwest Territories and therefore bush pilots were a part of her daily landscape.

As she describes:

In 1963 I lived in Hay River which is built on an island. The town flooded and they had to fly us to Fort Smith in a helicopter and from there we took a DC-3 to Edmonton. I've also been in a single Otter on floats and have done some circuits in a 180 Cessna on skis.

I believe many beginning pilots come to that first flying lesson with some image of the bush pilot in their mind. This image is often "borrowed" in television commercials (Miller Time) and perhaps it is the media that has encouraged the longevity of this image rather

than bush pilots themselves.

Most pilots consider bush pilots to be highly skilled. Andrea explains:

I've come across some really good bush pilots, hotshots. They seem to be able to party all night and then get up in the morning and take off.

MacMillan (1985), an investigator for Transport Canada, contended that based on her experience as a float plane pilot flying in the North, bush pilots had an innate sense of survival:

I did quite a bit of flying up North and I have all the regard in the world for bush pilots. A good bush pilot can survive. They can build a place to live, find some food, keep themselves warm, they could work their way out of almost anything. They really know how to fly air-planes too. They might only have grade eight education but that doesn't matter.

Listening to Andrea's comments about the bush pilots she had encountered, I got a sense of her admiration for resourcefulness, bravery, resignation to the passing of time and all good things. They had a special relationship to the land and all "good" things and mastered the skill of flying. Talking to bush pilots I had the feeling that I was in the company of masters. They perceived nature as powerful, dangerous, mysterious and to some degree untameable, despite appearances. What is special about bush pilots? Is it the way their labor draws wilderness into their culture? Is it predicated on the denial of death?

It is difficult to determine how much of the "baggage" Andrea brought to her first flying lesson included images of the bush pilot, but there is no doubt that some of her preconceptions about flying could be traced back to float planes in the Northwest Territories.

The Fighter Pilot: Precision Control - Awesome Power

An interesting phenomenon occurred when an airshow was hosted at C.F.B. Namao near Edmonton, Alberta in 1982 - in excess of 150,000 enthusiastic spectators showed up to watch! What is it about supersonic fighter aircraft that fascinates people?

There is little doubt that the public's image of flying is influenced by the unbelievable displays of performances exhibited by the fighter pilots at airshows. The managers of several flying clubs said they receive a barrage of phone calls inquiring about flying lessons after an airshow occurs. Andrea, too, mentioned that she was "fascinated by the speed of fighter aircraft."

One thing that came through very clearly in talking with fighter pilots is that they showed little interest in general aviation flying. Engel (1984), an ex-Navy fighter pilot comments:

To me it looks very staid, very drive the sedan on Sunday kind of flying, not the kind of flying I would want to do but then I came up learning different things and my recreational flying while I was in the military was pretty hair-raising. So no, I don't see it as it is today being attractive in that respect at all.

The military has had a significant influence on general aviation flying, not only in the displays it offers, but also in terms of the significant number of ex-military personnel that deal with general aviation today. Generally speaking, the standards of military pilots are significantly higher than the standards of private pilots.

"I Knew a Lot of People who Flew"

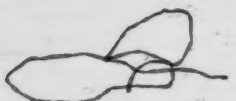
Many student pilots can trace their interest in flight training back to a few individuals whom they observed flying or perhaps even a pilot who took them "around the patch" once. Andrea spoke of her friend who "took her up in a Citabria and did aerobatics."

Cooper (1984), a pilot who enjoys float planes, comments:

I was always fascinated with airplanes. A friend of mine was a pilot and we went out for the occasional fly. Then I decided I would get my licence as I didn't want to wait for him to always be available to go when I wanted to go.

Some pilots find it difficult to trace the "roots" of their desire to fly. Devine (1984), an instructor, comments:

I forget. I always just wanted to. I worked with the airlines and then I associated with pilots, and I think that helped. I wanted to be a stewardess and travel, and then I got on the airplane and I wanted to fly it. So I think exposure to them gave me the opportunity to do it. I knew when I was flying on the big ones that I wanted to be a pilot, I just knew I did.



As Andrea concluded:

I knew a lot of people who were flying and I've wanted to do this since I was sixteen years old.

The Jargon of Flying

Andrea made the following statement about the difficulty she was having understanding the language of flying.

I can't say it all makes good sense. The radio communications are sometimes a total mystery. I have a basic idea what goes on ... It's just a matter of learning all the steps. Like a lot of other stuff, you have to learn the terminology before you really know what's going on

For example, the following communication between the pilot and ground control is a request for taxi clearance to the active runway: Muni ground, Cessna 180 - Charlie, Foxtrot, Uniform, Papa, Tango, at 6 A with Bravo, taxi clearance for local Westbound.

In addition to the confusion a student pilot such as Andrea encounters in radio communications there is a special jargon pilots use when talking to each other. J. Clarke (1984) comments:

You say, well why are pilots so different. They do have a different jargon and if pilots are talking to pilots, anybody that is standing in the back has no idea what is happening, so it does set them apart. I have had friends that I brought over here (flying club) that wanted to come over and they sit and listen, and we leave, and they say "God, I sat there for an hour and listened to you guys. It was very interesting but I have no idea what you said."

Flying is a Public Performance

Andrea made the following comment:

I have some friends here, and they all have a lot of experience compared to me, and I don't want them to see, to be watching when I bounce that aircraft. That would be so embarrassing, or do some other similarly dumb thing. Not that I am going to dwell on it it's not going to keep me awake at night, but the thought does cross my mind a few times.

There is little doubt that one of the stress producing factors in learning to fly is the fact that pilots are "performing" in front of a public audience. As a student pilot, the audience may include one's instructor, fellow pilots and the public in general. The pressure was on Andrea to "perform" up to the expected standards. As will be discussed in detail later, the landing appears to be the flight phase that is most often used to assess a pilot's flying proficiency. As Andrea puts it:

You want to get off the runway as soon as possible. So, if you land as quickly as you can on the first part of the runway then you can reduce your ground speed enough to turn off quickly, and you can get the heck out of the way ... you want to nail the button, it's the sign of a good landing.

This notion of Andrea's that a short field landing "is the mark of a good pilot ... more experienced pilots will turn off at the first taxiway" reinforces the idea that student pilots are often preoccupied with appearances rather than focusing on common sense flying. If you have a six thousand foot runway in front of you and and you don't have a Boeing "on your tail", why try

landing on the first five hundred feet? Why, because the general public and some pilots are convinced that flying is landing! MacMillan (1985) explains:

People go flying with you and the only thing they notice is the landing. They come up and say, "Wow, what a great landing." Well, the landing was nothing. What went on during the rest of the flight?

Perhaps one of the changes that occurs in pilots as they gain experience is that they focus more on accomplishing safe landings rather than smooth or short field landings. The confidence a pilot gains through time allows him/her to focus more on the task at hand rather than the public's perception of his/her abilities.

Flying is Like ...

When I think of turning the plane I think of skiing. I just think of using the rudder like I would use the edge of a ski. I have to make that adjustment from turning with my hands like I do in my car to turning with my feet. (Andrea)

Andrea saw further comparisons of skiing and flying as she progressed through her lessons. She points out that beginning skiers probably don't have much more movement control than student pilots.

Yes, it was just like the first few times I went skiing. At first the skis take you down and after awhile you take them down. Right now the plane "takes me down" most of the time. It's going to take me a long time to reach the level of confidence that I need, but once I do, I will fly up to the top of the slope ... and ski down! (laughing)

The automobile is often the only other piece of transportation equipment student pilots have prior experience with. There are few similarities between the actual manouvering of the two vehicles; however, student pilots do see some common elements. Andrea explains:

It was a little like getting into a car the first time you try to drive it yourself. You are trying to get an idea of where everything is. There are so many instruments and lights all in different positions and they mean very little to you initially. It takes time to know what everything is for and where it is located.

Gwilliams (1984) felt that pilots who have flown model airplanes have a little advantage over other students.

They have a feel for the attitude, particularly the landing attitude. If the model keeps flipping over on its nose you're usually wheel barrowing it (nose wheel touches first). As a matter of fact one fellow said he was having a terrible time landing his remote control. After a flying lesson with me he said, "You know, I bet you I can go out tonight and land that thing."

As Andrea and other student pilots soon find out, the aircraft lands best when the main wheels touch first. As Andrea said, "if you just pull the nose up a little bit it lands itself."

In light of Gwilliam's comments it would be interesting to explore the carry over between flying gliders as a lead up to flying full scale aircraft. Engel (1984) and Dawson (1984) both felt there would be some benefit in learning how to fly a glider prior to learning

how to fly an aircraft. I believe this also merits further exploration although not everyone agrees there are sufficient similarities to claim transfer of learning. My rationale for the benefits of such an approach would be that the student would never develop the fear of an engine failure (which you will see later is a common fear of all pilots) because there is no engine in a glider. The glider pilot must rely on judgment and skill as there is no power source which would allow a "pull up and go around." A respected, licencing inspector for Transport Canada, disagreed with the idea of introducing student pilots to gliding prior to powered flight, claiming there are too few similarities between the two skills (Ribout, 1984).

Andrea compared flying to other activities that had the element of speed.

Well, to a person who doesn't know anything about it, the prospect of going really fast is absolutely terrifying because at first you have no idea how you are going to control it.

Devine (1984) felt flying could be compared to other activities:

Basically, you are operating a vehicle, so it can be compared to some other vehicles, except for the fact that we operate in a different element. We are off the earth, not on it. I suppose you could compare it to a speed boat or a race car.

Gwilliams (1984) claims there are common elements between motorcycle touring and flying.

It is a skill something like race car driving or motorcycle riding. You have to have a lot of coordination and get comfortable with the element of speed.

Engel (1984) agreed that some forms of flying, the "being able to fly to Vancouver to see Grandma sort of thing" could be compared to other "sports" that involve speed and thrills.

Wyatt (1984), an aerobatic pilot, said he had "a special relationship with his lady." As I pursued the topic I realized he was speaking of his aerobatic Pitts biplane, an aircraft he had constructed almost from scratch. Being an aerobatic instructor I suspected he might view flying as more than a skill and perhaps may even feel it bordered on art. Although Wyatt rejected any notion of perceiving flying as an art form other pilots would disagree with him.

If the art of Flying were brought to Perfection; the use that I should make of it, would be to attend the sun round the World, and pursue the Spring through every Sign of the Zodiac. (The Editor of the Guardian, August 1713)

Devine (1984) commented when asked if she perceived flying as a skill, technique or an art form:

The first thing that comes to mind is art form. You have to have skill and technique but I think it can become an art form at the end ... if you can take it that far. Maybe not everyone sees it that way but I'm just an old bird, now, I'm used to being up there in the sky.

One could safely state that there are elements of flying that do have parallels in our ordinary existence; however, there are many aspects of flying that are unparalleled. Consequently, aviation writers face a certain dilemma. Bauer (1980) explains:

We must be careful to remember that the tools we have been using to describe flying had been words ... words are symbols of reality, not reality itself. (p.70)

Hayakawa (1978) also describes the semantic trap we fall into when we start accepting words as more than symbols for things. I will develop this point further when I explore the phenomenon of "getting lost", a situation which pilots often experience when they see more on a map than there really is. (The map becomes more than the territory it represents.)

If I perceived flying as a purely technical skill, there would be no problem in describing pilots' experiences. In technical language we are able to match the symbol and the reality. The fact of the matter is that flying is different from most other skills. The most valid way to verify my interpretations of "what flying is" is by experiencing it firsthand. Bauer gives further advice:

In this case the best solution seems to be to make the words as clear as we can by giving them a context, a setting in which they can be of the greatest possible significance to us. That setting, of course, is our own experience. It doesn't matter if others don't agree. We know what is true about our own lives, just as the pilot knows

that he experiences the world in a different way from his fellows who never leave the ground.

(p. 77)

The Pilot Image

As a student pilot, Andrea was faced with the task of 'making sense' of what it meant to become a pilot. Part of Becoming a pilot is learning the jargon, as was discussed earlier, and another important part is knowing your place in the pilot hierarchy. Student pilots are definitely at the bottom of the 'prestige ladder' in flying clubs. The climb to the Airline Transport Rating (the Ph.D. of flying) is a long and expensive one. The "student pilot" label is one that is difficult to accept at times. Most difficulties arise when a rookie pilot begins "performing a role" that is not acceptable to other pilots. Student pilots must "gain entree" to this culture before they can consider themselves part of the flying community. Clarke (1984) gives some examples:

They come in and they're macho, they're going to do this to impress the girls. They buy the jackets and the sunglasses. If they stick with it they find out pretty quickly that that kind of attitude is not going to work with other pilots. They change very quickly.

Devine (1984) suggested that there was a certain segment of the pilot population who "talked big" but who in actuality were cautious pilots.

A deeper ethnomethodological study could be undertaken to examine the various unwritten "rules" that one must learn to become a member of the flying community.

Andrea never developed an "ego problem" as she went through her training. She knew her place as a student and was not concerned with impressing her colleagues.

"There Would be Nothing More Ridiculous than a Woman Learning to Fly"

Andrea received very few comments from fellow student pilots (she was the only female in her ground school class) regarding the fact that she was a female student pilot. Although Andrea agreed flying was seen as "typically a male dominated sport" she felt she received good support from the pilots around her. Urie (1984), a high time instructor, claimed that women usually took more hours to complete their licence but "ended up being more competent pilots." Often among fellow pilots at a ground school lesson, Andrea found the same thing:

In my first ground school lesson I was sitting beside this fellow who obviously had a bit of experience. After coffee he asked if I had any flying experience but I did not really want to go into detail. He said "Don't worry about it, it will probably take you a bit longer to get your licence." I just said "Well, I'll just do the best I can" and left it at that. It made me mad.

Andrea repeatedly commented that she did not perceive a woman taking flying lessons as being an exceptional undertaking. As she put it: "Being perceived as a special woman because I am flying connotes to me that 'she is almost as good as us men' you know." The majority of the negative comments towards her flying interest came from non-pilots and particularly female colleagues at work. Andrea comments:

Around here (at work) a lot of women think that women who fly planes are kind of dare-devilish. They see it as a sport like racing cars. They say things like "I'd be too scared to take flying lessons, you must be nuts." Men don't seem to make such a big deal about it.

This chapter has attempted to describe and explain the role of the pilot in our society. What are the unspoken and unwritten laws, which are in constant operation, shaping the pilot's thoughts and actions? The roots of these perceptions can be revealed through careful observation of the pilot's world. In order to be accepted as a member of the flying community student pilots must identify and adopt the appropriate role.

When the pilot initiates the descent that will end in a public display of flying skills, he/she begins an information processing procedure that could be likened to the reader who carefully reads a text. The pilot's "text" will be explored in the following chapter.

Chapter III

THE PILOT'S TEXT

In a very thought provoking dissertation entitled The Encounter Between Reader and Text, Hunsberger (1983) explored and described the experience of reading. What is it like to be a reader? As I read through this exciting text it occurred to me that pilots, too, engage in dialogue with many "texts." These texts include the ground school texts, the aircraft operator's manuals, the Canada Flight Supplement, the flight plan, the maps, the aircraft journey log book, the aircraft technical log book and the pilot log book. In addition to written information, student pilots acquire information from a great variety of other sources. These include the instructor (flight and ground school), the air traffic controllers, the meteorologists, and fellow pilots. If we use the term "text" metaphorically, one could say (and often do) that "the pilot reads the clouds." In a sense pilots are constantly "reading" the "environmental text" that is unfolding in front of them. The aircraft, with its many instruments and dials, requires constant "reading."

In order to make this section of the description manageable, I will focus on the most fundamental sources and means of communication available to the student pilot.

The Student Pilot's Perceptions

In Andrea's case the first instructor she encountered was her ground school instructor. Not unlike other first meetings between teacher and student, the instructor made an attempt at establishing credibility. As Andrea put it: "She rattled off her qualifications at the first ground school lecture and that sort of established it (her credibility)."

Andrea was fortunate to have had excellent flight and ground school instructors. Henley (1984), a licensing inspector for Transport Canada, advocates that the instructor is one of the primary stress producing agents in flight training. Indeed, instructor competency is probably the most critical factor in the entire flight training experience (Howard, 1983). Andrea felt very comfortable with her instructor, David. She explains:

I know there is a very confident person sitting beside me to help me out should I get into trouble and that is very comforting. I think David realizes I have complete trust in him.

How did Andrea come about selecting David? It was just a lucky draw really. As she said:

When I went to pick up my books for ground school I met David. He asked me if I had an instructor yet and I said "No, I don't. Do you have to pick your own?" He seemed like a very nice man, very personable.

As was mentioned earlier, student pilots feel very insignificant in the initial stages of flight training. They feel they are not qualified to ask intelligent questions never mind evaluate the attributes of their instructor.

Andrea had some basic expectations and I suspect she would have voiced her views if she was not satisfied with the quality of instruction. She explains:

I expect him to give me instructions in plenty of time, especially at the beginning, because I know I won't be able to react quickly until I know what I am doing. I don't want to be in a situation where I am half way across an intersection and he says "Turn here." I don't want him to get too emotional, scream or yell or anything like that. That would cause problems. I want him to be patient if I make a mistake. I would like him to be able to go over what the situation was and what I did - what I could have done to correct it and then give me an opportunity to try it again.

Andrea went on to say that what she wanted most was "honest communication" without any emotional outburst "like my dad did when he tried to teach me how to drive." She expressed a need for a steady flow of feedback and an immediate acknowledgement of errors.

Probably one of the first observations a student pilot makes about flying is that there is a great number of procedures to follow. Flying appears to be one routine after another. Flying is a very orderly event. The "old birds" as Devine (1984) respectfully entitled experienced pilots, move through pre-flight checklists

with a certain rhythm and common sense order. Student pilots have not developed this rhythm and flow with procedures. Andrea sheds some light on this concern:

I don't understand many of the procedures. I know the frequencies are down on the checklist, but after we got the recorded weather report, he did all the radio work and he didn't explain that much to me. It seemed there was a lot to do before we took off but I don't remember specifically what was going on. He told me we were cleared to take off on runway 34. That's the largest runway I think.

Although it may be that the age of an instructor has no bearing on the ability of that instructor to teach, Andrea felt more comfortable with an older instructor. Risk (1985), the chief pilot and head instructor for a commuter airline seriously questioned the rationale of using the least experienced pilots to teach other people how to fly. As Andrea said, "I think the age of my instructor is pertinent ... I am more comfortable because I have an older instructor."

After Andrea's first instructional flight she commented that although "it was very exciting" her instructor "did just about everything." There is no doubt that it must be difficult for the instructor to determine how much of the flying the student should be involved in at various stages of flight training. As Andrea put it:

I managed to do a little bit of straight and level flying and I asked him if I could turn the plane myself. He said "sure" so I went ahead and did it and I think he was quite impressed.

One of the difficulties that student pilots encounter is that situations seem to develop very quickly once the aircraft has left the ground. (Time as a major factor in flying will be discussed later.) A second difficulty is that instructors are not always aware of how obscure the student pilot's comprehension of a specific procedure is. For example, the first time Andrea and David flew to the training airport to do circuits, Andrea had no idea what the purpose of this lesson was at the time of departure. As Andrea later stated:

I was really disappointed. He didn't give me a ground briefing before we took off or a written description of what we were about to do. He said "Oh well, I will tell you what to do and then you do it."

It seems a logical way to introduce a student pilot to the procedure used to enter and fly in a circuit would be to draw a diagram and illustrate the pathways the aircraft should follow prior to actually attempting in-flight training. Failure to adequately brief Andrea resulted in some confusion:

He said you should turn now and I wasn't sure what we were going to do. He said we might land (at the training airport). Then he said turn to such and such a heading now. I was trying to keep everything going. It wasn't until we landed that I realized we were doing circuits.

Good communication existed between Andrea and David and because of this she was able to explain her concern over not being properly briefed before the flight.

As a result a thorough briefing preceded each of the subsequent flights.

The quality of the student-teacher relationship will to a large extent determine the quality of the entire flight training experience. Henley (1985) is presently investigating this relationship and I believe her research will shed new light on the interchange that occurs between the student pilot and the flight instructor. Students become attached to their instructors and to some extent instructors become attached to their students. Andrea did not enjoy flying with other instructors. She enjoyed being instructed by David:

He's (David) got a good sense of humor and is always very relaxed. In fact, sometimes he puts his arm around me when we're flying. I said to him, "Do you put your arm around all your students?", and he said, "Yes, but it's more fun when they're female (laughing). "David jokes around and I know that if I make a mistake he will laugh it off.

As educators we know that dialogue between the student and the teacher is essential for learning to take place. The more feedback the student receives the quicker the student will acquire skills. A good instructor must know when to give feedback. Andrea gives an example:

I talk to David a lot. I say, "This isn't going to work." David will say "Why not?" and I'll say "I'm too low - I need to add power." and he says "Yea, that's a good idea." He'll make suggestions if he feels that I'm panicking or

if I'll be a little too slow in reacting. He thinks I will usually figure out what to do. He thinks I'm too picky. I would like to land on the first third of the runway and he says, "At this point I don't care where you land as long as it's on the runway somewhere."

As Andrea progressed further in her flight training she felt David was becoming more and more critical of her performance:

The moment I did something wrong, he'd jump on me for it right away. He wouldn't give me a chance to correct myself.

No doubt it is very difficult for instructors to decide when to criticize and when to ease off. Some students need constant pressure from teachers and others break down under pressure.

Clarke (1984) suggested that instructors start applying pressure near the end of the training program because the instructor is primarily evaluated by the performance of the student. She claimed, "Before that it was all sweet talk because he wanted the money and he wanted you to come back and keep up the lessons."

Devine (1984) felt the instructor had great influence over the success of the student. As she states:

You either click with them or you don't. The student can be as intelligent and conscientious as ever but if the instructor is no good they are going to have trouble learning.

Other pilots such as Cooper (1984) felt they could have learned a great deal about flying by simply watch-

ing exceptional pilots. MacMillan (1985) claimed that a great deal could be learned about flying by watching the performance of the seasoned bush pilots. She explains:

Go out in the middle of nowhere and your chances of having an accident increase dramatically. Those people are the people I admire the most, they're the people I felt I could learn the most from about flying. The guys doing that kind of flying did not seem to have the kind of inflated "show off the stripes on your shoulder" attitude that a lot of pilots who envision themselves as airline captains seem to have.

Radio Communication

After the pilot steps into the airplane, the radio is the primary means of communication with the outside world. In the air it is our link to the earth. I believe that initially Andrea "went through the motion" of radio communication without really understanding its significance. As she said:

I contacted the tower after I took off and told them where I was going and what not, but I can't remember exactly what I told them now.

In the first stages of flight training it is difficult to remember all the proper radio procedures as well as concentrating on flying the aircraft. Andrea describes one of her incidents:

There were a lot of radio calls. I gave the pre-take-off, I requested the clearance to taxi out and to go to the practice area and then I couldn't seem to get my call in to request clearance to take off and so David said, "Here I'll do it", because he could get the calls in quicker.

Part of the difficulty the student pilot exper-

iences with radio work is the difficulty one has comprehending the air traffic controllers. As Andrea said, "Sometimes the controllers are not too easy to understand, 'cause they don't talk very well into the mike." With time Andrea became more familiar with what they would typically say in various situations and was able to anticipate their requests.

As time went on Andrea felt more prepared when she had written out a list of who she should talk to and in what order as she flew in and out of various control zones. Additionally she found that wearing a headset allowed her to pick up radio transmission easier.

Map Reading

Pilots' navigational charts are of course much more complete than the road map most drivers are familiar with. Pilots need to know the heights of hills, towers, mountains, and any other obstructions that might protrude into flight space. At the same time, road maps are more complete than a world atlas might be. These maps all depict the same territories but in different ways.

Most student pilots experience some difficulty relating the map to the actual territory they fly over. As mentioned earlier, the map is not the territory but merely a symbolic representation of the territory.

Bauer (1980) draws some interesting comparisons between maps and society's construction of reality:

A society's construction of reality, its description of the universe is analogous to a map. It tells us, in general, what we need to know to get along, but like the map, it is incomplete. We tend to mistake our map of reality for the universe itself, denying the existence or even the possibility of the existence of anything not symbolized on it. (p. 32)

Although pilots are viewing the same world, the different perspectives, the different angle of view often distorts their view of it. Probably the most frightening experience for beginning pilots is being lost. If you have ever been lost in the woods you can appreciate the anxiety that pilots must experience when they are unable to identify their location and yet are moving through space at one hundred and fifty miles per hour. In many situations, losing one's orientation in an aircraft is caused by poor visibility as a result of deteriorating weather conditions. This phenomenon of being lost will be discussed later when I examine the space dimensions of flight.

Returning to Andrea's first experiences with orienting herself in flight, she expressed some concern about "visualizing the layout of the airport." She knew the runways at the training airport were 08-26 and 16-34. She knew that the spatial relationship of one runway to the other was almost an L-shaped; however, she was unable to transfer the symbol (the

schematic) to the reality (the territory). Andrea describes how she resorted to a system of preplanning every phase of her flights:

I sit down and write out absolutely everything that I have to do from the time I walk out of the flying club office. I draw a map of the (city) airport and then I draw a map of the (training) airport and I put the numbers on the runways. Then I visualize which are left-hand circuits and which are right-hand circuits and I draw arrows. I say, "Okay, if they say I'm cleared to left base, then I go in at this point." Sometimes I call (telephone) and find out which runway they're using so that I don't have to make too many guesses. Sometimes I have trouble finding the (training) airport so it helps to get that little map in my mind's eye.

Engel (1984) stated that pilots "have a sense of being comfortable with numbers." There is little doubt it is important to be able to monitor airspeed, altitude, radio frequencies and other numbers as a pilot. Perhaps part of the disorientation that Andrea felt had something to do with her (and most student pilot's) lack of experience in relating magnetic headings to actual directions. A heading of 270 degrees did not automatically register as westbound.

Dialogue with Self

I believe it is fair to say that when one is in the process of acquiring new skills we question our performance much more than when we have gained a reasonable level of proficiency. This kind of self-evaluation is of course essential for any kind of per-

sonal growth. In flying, the pilot must be able to decide if his/her skills are adequate to meet the demands of the various conditions (primarily environmental). In this section and in the following section I will discuss Andrea's thoughts on self-instruction and the notion that flying can become a form of meditation.

Andrea tended to be very critical of her performance. She would make comments like: "I have to pay more attention to details." and "I want to do it perfectly." She was aware that the mood she was in (which she said was highly influenced by her work day) could influence her flying. She explains:

My flying performance has a lot to do with how prepared I am. He (instructor) said something about soloing by the end of the month and some days I think, "Hey, that is really great." and other days I just can't get excited at all. It just depends on my mood ... how I feel that day.

There is no doubt that most student pilots reach various plateaus in their flight training. For one reason or another progress seems to be slow for a period of time. Andrea comments:

It's really frustrating. I read about doing circuits, I study it for five hours, I'm trying to get everything down pat and then I go flying and I keep doing poorer and poorer. I'm beginning to find out how little I know. There are a lot of things that I just don't know.

As time went on and Andrea became more proficient she was able to evaluate her readiness for the solo flight. As she put it:

I am getting so that I can do circuits very easily. I know what to do when you take off and what to do in the various legs of the circuit.

After Andrea had soloed her concern was not whether she could land but rather the quality of her landings.

I wasn't too happy with a couple of landings I made today. They were a tad hard. A couple were really nice, really smooth.

Once Andrea was comfortable with her circuits and some basic navigation procedures, the next challenge was the cross-country flight.

I don't even want to think about the cross-country. It terrifies me. I know I'm not ready for it.

On some occasions the 'dialogue with self' was almost a form of self instruction. Andrea claimed that if the controllers could have heard her inside the aircraft they would have questioned her sanity. She gives the following example:

I talk to myself on some of the final approaches. I say things like, "Come on, get some power on, get that nose up." It was almost like I had someone there telling me what to do. It helps me to talk out loud to myself ... especially when the winds picked up. I would say, "Okay, lift the nose up ... okay, right rudder." I'd always say that to myself. "Adjust the nose to 70 knots - trim."

Multiple Realities

And now a strange thing happens. It is so delicate and ephemeral that even to recognize it and allow it to enter our consciousness may destroy it. It is that, while flying, the rest of the world disappears. We suddenly have no past or future. We have only our flight. We are existing in the here and now. By increasing our concentration, through the paradox of not concentrating, the mind is empty of the immediate moment

of experience; it is open, clear, and fully alert, and at the same time free of everything but the present. (Bauer, 1982, p. 52)

On several occasions student pilots have asked me what I focused on or thought about when I was landing. I usually gave some technical answer about the runway flattening out and so on. The fact of the matter is that once my airspeed has stabilized and I have established an appropriate glidepath, I really don't think about anything. I am acutely aware of all sensory information but I am not actively thinking about anything. In a sense my mind is empty.

I believe flying presents an opportunity for pilots to move into another reality. Pearce, (1973) who focused on the relationship between culture and perception, called this state of mind when we are able to ignore the perceptions that cause us to maintain the status quo, "turning off the chatter on the roof of the brain." (p.21) Whether one views this state of mind as a form of meditation or transcendence, suffice it to say that many pilots speak of special moments of tranquility. Andrea, for example was so accustomed to having her instructor sitting beside her that even when he wasn't there she could still "hear" him. She elaborates:

David wasn't beside me but I didn't really realize that I was up there alone and he was on the ground until I was downwind. I had too much to think about, but he might as well have been sitting

beside me because when I was coming in for a landing I could hear him saying, "Okay, lower the nose, keep the air speed at 70 knots, okay, time to flare, straighten her out, okay let her settle down, okay nose up - get the nose up."

As Andrea's flying skills improved she became less conscious of the more automatic components of flying. In fact, she found she had a tendency to think too far ahead at times. She explains:

We're taking off from (city) the airport and I'm already thinking about landing at (training) the airport ... what runway we are going to use and how I'm going to get there. I'm thinking too far ahead.

Later Andrea admitted that she was becoming "less conscious of what she was doing." I noted that towards the end of Andrea's flight training she was able to relax more and enjoy the experience of flying. As she said:

During my solo cross-country, I monitored 126.7 enroute and every time someone talked on the radio I jumped. I was just so totally into myself - my own thoughts. I was startled every time someone spoke.

Andrea also commented that "maybe the fantasy (part of flying) is more exciting than the reality." Many other pilots have spoken of these blurred horizons between fantasy and reality. Wilbur Wright made the following comments after his first few flights:

When you know, after the first few minutes, that the whole mechanism is working perfectly, the sensation is so keenly delightful as to be almost beyond description. More than anything else the sensation is one of perfect peace, mingled with

an excitement that strains every nerve to the utmost, if you can conceive of such a combination. (Walsh, 1975, p. 188)

Wright, of course, not only invented the airplane but taught himself to fly. He had the technical skills of a scientist as well as the creative talent of an artist.

Charles Lindberg had a reputation of being very much a rational man of science. In his account of the non-stop Paris flight, he spoke of "friendly, vapor-like shapes, without substance, yet real." He goes on to say:

At times, voices come out of the air itself, clear yet far away, travelling through distances that can't be measured by the scale of human miles; familiar voices, conversing and advising on my flight, discussing problems of my navigation, reassuring me, giving me messages of importance unattainable in ordinary life. (Lindberg, 1953, p. 389)

Pilots can reorder the world as they fly and in a sense are reconstructing reality. Devine (1984) shares some of her thoughts:

You look outside (the aircraft) and you just have that feeling of total freedom. You are just up there floating around. I often have this fantasy of being a bird. Haven't you felt that way? Flying over the tree tops, evergreen trees, just soaring through the sky.

Several pilots spoke of the religious affections that they felt as they soared above the clouds. This may have been partly due to the idea that one is closer to the heavens or it may be that one is able to concentrate more on religious thoughts when removed from the earth's distractions.

Clarke (1984) says:

I can just get excited about thinking about it (flying) or talking to another pilot about their relationship to the airplane or to flying.

Engel (1984) had come from a very structured military flying background, he also spoke of the delight of flight:

.. the sheer ecstasy I guess of my experience, my flying was to take a fairly high performance plane and go up on a day when the cumulus clouds were billowing off the Gulf of Mexico up 10, 12, 15,000 feet. Then just kind of rock and roll with them. That was an experience when you become a part of the plane, you become a part of the turbulence, the whole ambience of being really along in a vast space and interacting with the light flashing off and on, in and out and around the canyons of the clouds ... really a fairyland situation as you would probably know.

I believe that Bewsher, in his marvelous poem, The Joy of Flying (1936), captured some of the thoughts and sensations that many of us pilots have felt but were unable to express with the technical language we have grown to accept.

The Joy of Flying

When heavy on my tired mind
The world, and worldly things, do weight,
And some sweet solace I would find,
Into the sky I love to stray,
And, all alone, to wander round
In lone seclusion from the ground.

Now do I mount a billowy cloud,
Now do I sail low o'er a hill,
And with a seagull's skill endowed
Circle, and wheel, and drop at will -
Above the villages asleep, --
Above the valleys, shadowed deep,

So do I love to travel on
 Through lonely skies, myself alone;
 For then the feverish threat is gone
 Which on this earth I oft have known.
 Kind is the God who lets me fly
 In sweet seclusion through the sky!

Paul Bewsher - Dawn Patrol

Instinct and Flying

Where does instinct enter into flying? Is there such a thing as a "natural pilot?" Many of the pilots I interviewed spoke of having known, flown with, or instructed, a "natural pilot."

MacMillan (1985) explained:

I had one student (pilot) in the time I was instructing who as far as any mechanical handling the airplane, I've never seen anything like it. You show him any manoeuver once and he could duplicate it exactly. Ask him to do it again in two weeks time and he could do it better than I could. It was just phenomenal.

Dawson (1984) said she did not consider herself to be a natural pilot because as she put it: "I had to learn everything that I did." She also felt that some pilots just had a "gift" and that it was difficult or impossible for some pilots to develop their skill to the level of the a 'natural'.

"Being a part of the machine" is a quality that Devine (1984) and Engel (1984) associated with the natural pilot phenomenon. Engel explained:

If you stripped away the uniform, the military courtesies, ... and that sort of thing, you would have natural leaders, you would have natural intelligent people, you have have natural pilots.

(When instructing) a natural pilot, everything would come to normal (the aircraft would be controlled) each time (they took control), almost as if they were a part of that equipment. A natural pilot is able to handle them (instruments) a heck of a lot more readily than a person who is fighting this three dimensionality.

Cooper (1984) described a natural pilot she had flown with the following way:

He knew his limitations. He was extremely intelligent, I would think he was probably a genius. He could fly anything and fly it well. He was there, on top of the aircraft all the time.

Singleton (1978) a researcher in the field of motor learning and allied fields, did not feel it was possible to have a natural pilot. He perceived flying as a skill behavior and not an instinctive behavior. Those pilots that we might perceive as being naturals, have refined their flying skills to such a point that they waste no effort, they have a certain "skill-economy" that makes the task appear easy. Singleton says:

Instinctive behaviour is innate and consistent, skilled behavior is learned and variable but obviously we can have an innate drive served and modified by skilled behaviour patterns. (1978, p. 5)

Could it then be that although flying skills must be learned, the desire to want to learn how to fly is an innate drive in some people? It may well be impossible to answer this question considering that skilled behavior is the compliment of instinctive behaviour. There is a

continuum rather than a rigid separation of two types of behavior.

Andrea was described as an "average" student by her instructor and, therefore, could not be considered in this mysterious "natural pilot" category. She spoke of developing a sense of how to react automatically to various situations.

After awhile it is like driving ... you know what you can do. After you have done so many take offs and landings, in so many situations - you don't have to think of every little detail.

However, on several occasions, Andrea too alluded to the instinctive nature of her flying. She spoke of her final approach to a landing:

I seem to land almost instinctively. I come down for my approach and I pick a number on the runway and make sure it doesn't move in relation to what I can see (in the windshield) and then I know my approach is okay. I just have a feeling my approach is okay.

On one occasion, Andrea had the opportunity to fly with a young and relatively inexperienced commercial pilot. Andrea described this flight to me in detail and at the end of the conversation she concluded that she would "never fly with such a cocky pilot again." At that time Andrea had completed only fourteen hours of flight training and she admitted that her assessment of Allan's skills "was based more on intuition than a real understanding of flying." The full consequences of Andrea's instinctive decision will be described in a section

that deals with individual volition and more specifically airplane crashes.

Rosenblatt (1980) makes the following statement about the relation between the reader and the text:

In ecological terms, the text becomes the element of the environment to which the individual responds. The reader looks to the text, and the text is activated by the reader. (p. 18)

The demarcation between subject and object becomes irrelevant. In flying, the pilot is in the text (in the aircraft in the weather) and can hardly objectify or distance a text that is life-sustaining.

In reading, the idea is that an interpretation is not fixed, but is likely to change over time. As Hunsberger (1984) says, the re-reading of a text is a different experience than a first reading; changes are not only possible, they are usually unavoidable. In making the analogy to flying, this idea is crucial. The text, (written texts, the aircraft, the environment, the humans we encounter) is constantly changing, and a pilot must keep reading (or re-reading). This is so in the sense that the weather and the state of the aircraft are not at all fixed. Such texts as manuals, maps, (written text) are more fixed than the weather, but they also are updated over time and change in that way. (As man and the environment change the form of the face of the earth, new symbols (maps) must be created

to inform pilots.) As was discussed earlier, the same written text will speak differently to a pilot depending upon the pilot's (or operator's) interests and needs.

I would like to give an example of these multiple interpretations of pilots' texts because I feel this is an area that can result in much chaos in flying. The amount of weight an aircraft can carry is clearly indicated in several manuals which must be carried on board the aircraft. It is widely known that many commercial operators overload aircraft. A commercial pilot gives the following example:

Airplanes can and are flown very regularly overloaded. I have had experiences when I flew for some operators where the overloads were printed right in the manual. You could see what a 172 up to a Navaho could handle as far as overloads were concerned. It was not to be seen by anyone but the pilot but it was highlighted in red ink which I always thought was pretty forward.

In the case just described, the pilot must decide which text to read, the legal one or the illegal one.

As a pilot flies he/she is constantly reading and interpreting. One reading and interpretation is insufficient. As will be discussed later, mis-reading the text often results in being lost and in many cases an accident occurs. The "reading" must never end when you are flying because the text keeps changing. This is why pilots must keep interpreting. Like any good reader, the pilot must not merely react, but must predict and antici-

pate. Flying skills need to be mastered so thoroughly that they are done automatically, allowing the pilot to focus on making informed judgments and interpretations.

In conclusion, the pilot's text can be viewed as the "element of the environment" to which the pilot responds. Everything the pilot takes into account, each source of information, is part of that text. The pilot considers each text separately (much as a reader can only read one book at a time) but at the same time never views all factors in isolation from each other. The pilot brings to each flight a certain kind of pre-understanding of what is to be expected. However, it is only by means of "engaging in dialogue" with the various texts at hand, that safe flying can occur.

Chapter IV

THE FLYING MACHINES

The Impact of Technology

It was really strange. I wanted to keep looking at the instruments all the time instead of looking outside the cockpit.

Andrea's fascination with the very impressive display of gauges and avionics is a typical reaction of many student pilots. The intended use of the instruments is to inform the pilot as to the attitude of the aircraft and also to monitor the engine and other components. Airplanes were not always so sophisticated. As Devine (1984) states:

We are in these computerized fancy modern little airplanes. In the old days, they were flying a death trap. They did not know anything about them. If you read some of those old stories, you just shake you head in amazement, like those had to be a special breed of cat.

Andrea displayed a certain increased interest in radio navigation as she progressed through her studies. As she put it:

Most of the planes have an ADF and a VOR in them. I've been shown how to use it (ADF) but I really don't understand it. I would like to take an instrument rating. It might be a good idea to learn how to do a bit of instrument flying so at least if I got myself into bad weather, I wouldn't lose my cool.

Ironically, it is often the pilots who "do a bit of instrument flying" who seem to get into the most difficulty.

In a flight on which Andrea was a passenger with a "wet behind the ears" commercial pilot this is exactly what occurred. As Andrea describes it:

Between Ortenfeld and Pinewood we got lost. He said, "Oh, these damn instruments are not working, they never do work!" and he said a few other choice words.

The instruments of course are only as good as the person using them. In the above example, the journey ended without incident because the pilot finally saw the city lights.

Reliability and Redundancy

There is a certain security in the drone of an aircraft engine. If properly maintained, they almost never quit inflight. The most common cause of inflight engine failures is fuel exhaustion which of course is pilot error. Aircraft rarely "come apart" inflight. In most cases where this occurs the pilot has overstressed the limits of the airframe (this very often happens when pilots fly into violent thunderstorms or become disoriented in clouds). It is quite possible to pull the wings off an airplane by pulling it out of a steep, high speed dive too quickly.

There is a tendency for non pilots to draw comparisons between aircraft and automobiles. This is an unfair comparison as the aircraft is designed to far higher structural and mechanical standards.

Unlike automobiles, airplanes are required to undergo a very thorough inspection every fifty hours (6000-7000 miles). Aircraft owners are compelled by law to maintain their aircraft in perfect condition. The book keeping that accompanies all these inspections is of course quite precise and tedious. Pilots trust their mechanics to verify that the machine is safe to fly.

Student pilots are taught to respect their aircraft and to carefully inspect it before any flight. Andrea had some appreciation for internal combustion engines because she had "ripped apart a car one summer." Owner pilots tend to be even more keen about upkeep:

I am fanatic about maintenance. If anything ever happened (mechanically) at least it would be widely known and documented that I did everything possible to keep that thing (the aircraft) in top shape. That is why I check on the reputation of mechanics and don't take chances. You can't fool around with that stuff. (Edwards, 1984)

Aircraft are designed to fly even if things go wrong. There are two sets of spark plugs, two magnitos and of course the engine does not need a battery to run. If worse comes to worse and the engine quits, aircraft make not bad gliders. (Air Canada proved this with the 767 that landed without power after gliding for over one hundred miles)

Control Inputs

Airplanes are awkward and ungainly machines on the ground: their beautiful shapes were of course designed

for movement in the air. Although somewhat less manoeuvrable than an automobile on the ground, there is nothing quite like the movements of an aircraft in flight.

Andrea's first concern was to become familiar with the basic operation of the aircraft.

I was mostly concerned with the operation of the machine. What I really needed to get used to was steering with my feet. Once I got the hang of where everything was and some sense of how far the plane would bank when I turned the controls, I felt more comfortable. I'm not sure where all the controls are now and I certainly do not feel confident. It was certainly more fun than driving my car.

A common comment made by student pilots is that there are too many procedures to remember. As Andrea said:

I really didn't know what was going on. He (instructor) started fiddling with the throttle. I was busy with the rudders and turning and trying to keep it level. He explained to me that you have to follow a checklist ... switch that control ...

The movements the aircraft makes in space are brought about by power adjustments or changes to the shape of the airfoils. Extending or retracting the flaps for example, will change the performance characteristics of an aircraft. Andrea experienced some difficulty in determining exactly how much control input to use.

I overcontrolled the airplane. I put too much pressure on the rudder ... I just stomped on it, I learned that is not a wise thing to do when you are landing.

One of the tests of flying skills for student pilots is the cross wind landing. During this manoeuver, careful application of control inputs must be monitored by the pilot. Andrea explains:

Okay, my right wing is down and my left rudder is on as much as it will go to keep myself going straight. I'm trying to maintain 70 knots and a good descent attitude. If I'm too low I'm going to have to add power.

Person - Machine Relationship

According to a long standing view, technological artifacts are to be understood as extensions of man - the telescope, an extension of the eye; the automobile, and extension of the foot, the computer, an extension of the calculating function of the brain. (Burch, 1984, p. 8)

We know that people develop almost human relationships with their machines. When posed with the question as to what she considered the aircraft to be an extension of, Andrea replied:

It's an extension of my feet. It's part of my feet because you have to steer the plane with your feet and most critical movement in the air are initiated by the feet.

Beekman (1983) suggested that driving a car was not just a means of transportation for many people but was in fact a "power trip." Andrea said initially that "it didn't give me the feeling of power." However, shortly after she added that she was excited about the fact that she was "actually the person responsible for making it move." She suggested that she was "learning how to drive a machine" although it was different from

any other machine she had driven before.

Mourier (1948) suggested that "the machine as implement is not a simple material of our members." What then does the aircraft "become" to the pilot.

Andrea comments:

Well, I wouldn't come right out and say I am having a romance with the plane. I am enchanted right now. I am the one who is sitting there and actually manipulating this thing. I am nowhere near that stage where I could say I am in control of it.

Clarke (1984) suggested that some students do develop "some sort of relationship with their aircraft." For some reason one aircraft seems to work much better for them. She adds: "I used to have my favorite airplanes too but that was just because they seemed to respond better."

Devine (1984) claimed the person-machine relationship is different between owners of cars or boats and owners of aircraft. She explains:

It is not like operating a car or boat in that pilots worry about coming down. It is their lifeline. Of course they get attached to them. It becomes a part of their being. I think they are thinking "don't let me down."

Grandchamp (1983) in his study of fear in flying, outlined over a dozen specific kinds of fear people have as pilots. In the following statement, Andrea speaks of one of the most common fears.

I think a lot of people are quite scared of being in total charge of a machine that is capable of getting them killed you know. I think that a lot

of people feel that they don't have the capability of operating the machine; that the machine would end up operating them.

Andrea gave the impression that in flying, the machine gets you killed. Of course, a far more accurate assessment is that poor piloting skills kill pilots. This notion that the aircraft has a mind of its own emerges in Andrea's statement:

The thing (aircraft) wanted to land right now. I waited until I turned final before I pulled the power off and I'd still have to add power to get over to the runway. When I added power on take off she lifted right off.

Concentration through Relaxation

Many times when we are learning new skills, the instructor will say "you are too uptight, relax a bit and let the movement flow." For example, Andrea's instructor made the following observation:

You're just coming into the runway, you've got it perfect (landing approach), it's right in the middle, everything is straight, the wings are level and just as you approach the runway, you pull back with that tight arm. You have to relax through the landing. Just ease back slowly, keep your wrist relaxed.

How can one possibly relax when dealing with a situation that is happening so quickly and holds an element of danger? One thing for certain is that as we gain proficiency in skill, we are able to focus on the task at hand and ignore inhibitory stimuli. However, even when I was flying with Andrea (as pilot in command), doing cross wind landings in my Cessna 180 (a tricky aircraft to land) she commented:

I noticed that you were quite tense when you were doing touch and goes.

Cross wind landings, of course, present an extra challenge to pilots of light aircraft. Aircraft are relatively light (under three thousand pounds) and tend to get blown off the center line of the runway in strong cross winds. Being blown off the runway is, of course, a stressful experience for student pilots. Andrea explains:

There's a lot more to look after (in a cross wind). It's not as relaxed at this point. We did practice crabbing and that was helpful but I did find it very nerve wracking.

Probably one of the most stressful experiences for the student pilot is the first solo flight. There is no way the instructor can really simulate this experience as how can one "pretend" someone else is not there when they really are. As Andrea mentioned earlier, she was comforted by the fact that she had a really competent and sensitive instructor to take over when things "fell apart." In the solo you don't have anyone but yourself. (Because the solo is such a significant flight, it will be discussed in detail in another section.)

Nonetheless, Andrea's instructor tried to prepare her for this event:

It is one thing for me to be sitting there and another thing for me not to be there beside you. You have to keep cool. Don't worry about making a perfect landing; just make a safe one. Sometimes you try too hard. Relax a bit more and it will work better.

Andrea later commented that she had to "prove to myself that I could handle it."

So how can we relax and yet concentrate on the task at hand as terrifying as it might be? Bauer (1980) gave the following insights:

When we learn to relax, to control our reactions and to manage our coordination, our body will respond intuitively to the subtle changes in the atmosphere and keep the airplane on course and at the altitude we want to maintain. As we do this all our sensory systems seem to operate at peak levels of alertness. (p.47)

Bauer's suggestion is that our eyes, ears and kinesthetic senses are all responding to the movements of the airplane. This is our built in autopilot which keeps us moving along the various pathways in space.

Andrea's skill developed with time, and accompanied by increased confidence, she was able to experience her world of flying more directly and immediately.

I called the tower and told them I was ready for take off. I WAS ready. I wasn't thinking about anything except what I had to do at the particular moment. There were no extra thoughts floating into my mind. I didn't think about landing until it was time to land. I was just as cool and calm as could be. Everything went perfect.

At this stage, Andrea did not have to think about what she was going to do, her mind and body were trained to act without conceptualizing what the action should be. The key point here is that during the time when Andrea was going through that circuit, she was able to bypass

her rational thought process through which she usually filtered all her experiences. She responded directly to the changing atmosphere. As she once said:

I serve the needs of the plane at that time and in turn it responds favorably to me.

Have you ever caught yourself interpreting what someone is saying to you instead of just listening to what they are saying? We have a habit of abstracting perceptions rather than experiencing them. This tendency to screen the world through abstraction and conceptualization allows us to filter out what we don't wish to see. By doing this we are able to perpetuate the same landscape. Pilots don't have to do this. Once a pilot has trained his/her responses to do the work of flying, he/she is able to stand aside and move to a different level of consciousness. Andrea describes this state for her:

It's difficult to describe. When I am flying by myself it's almost like a form of meditation. My body doesn't shut down but I am definitely in a different state of mind. I am relaxed and I know exactly where I'm going.

Perhaps Andrea's statement that flying is "a form of meditation" for her should be viewed more carefully. If we look at Eastern traditions and more specifically the meditation techniques developed by samurai warriors, we become aware of a state of mind when concentration opens awareness at the same time that conceptualization is reduced. The mind becomes empty but the warrior is

able to experience everything he senses.

In flying as in combat, to hesitate, to stop to analyze, to screen perceptions through the thinking process, could mean disaster. We often control the airplane without consciously trying to do so. There are limitations to the rational functions of the mind, and at certain times pilots must set them aside.

I close this section with an example from my own experience:

About a year ago my young daughter and I were landing at a city airport. We were on final approach, just over the runway when a flock of birds took flight in front of us. It was obvious I could not avoid them as adding power would be too dangerous. I clearly recall flying through the flock, focusing on making a normal landing without alarming my daughter. A half dozen birds were killed and the aircraft sustained some damage. I remained calm and my daughter's only reply was, "Birdie daddy."

The situation never became an incident, because neither of us perceived it that way. Had I chosen to do anything but what "felt" natural at the time, we may have had real problems. I saw a normal landing and my daughter saw a "birdie."

Chapter V

THE SKY

Four Several Ways of Flying in the Air

There are four several ways whereby this flying in the air, hath been or may be attempted. Two of them by the strength of other things, and two of them by our own strength.

1. By Spirits or Angels.
2. By the help of Fowls.
3. By Wings fastened immediately to the body.
4. By a flying Chariot.

It would be one great advantage in this kind of travelling, that one should be perfectly freed from all inconveniences of ways or weather, not having tempests to molest him, this air being perpetually in an equal temper and calmness. The lower cloudy regions are so full of tempests.

John Wilkins, Bishop of Chester
- Mathematicall Mogick, 1648.

Although this account is several centuries old, the attractiveness of the sky accompanied by an appreciation for what the elements can do to us, is still there. Perhaps if one could come to a deeper understanding of the fascination with traversing the sky, we could establish what is so attractive about flying itself. Is flying attractive because it happens in the sky?

The Attraction of the Sky

The Lure of Flying

Those who go up into the clouds in trips and take their travel across the sky, in the simplicity of a small aeroplane, can bear witness to much that is eternal and elemental. They can see the morning awaken and leap from the ground in a new day, they can hear the loud triumphant shout of gangster gales, feel the ghostly touch of cloud curtain

and storm, and become acquainted with the fadeless duck's egg blue of the sky, always most tender in color when it has mountains for a neighbour.

(Byrd, 1933, p.32)

It may be difficult to determine what specifically is the attractiveness of flying. The term "simplicity" seems to keep emerging and certainly there is some suggestion that pilots enjoy their new view of the world. I will expand on the simplicity theme later as I feel it is a key one and illustrates another paradox in flying. (A complex means of performing a simple skill.)

The sky is the space in which flying takes place. When there are no clouds or wind, there is a certain emptiness to this space. Pilots regard clear blue skies as a delight. Clear skies offer unlimited freedom of movement for pilots and one can proceed without question. It is when these spaces are filled with obstructions (clouds) and erratic air movements (wind) that the quality of the flying experience diminishes. The clouds, wind and temperature changes bring variety to flying.

Before I proceed with a discussion of why we like to be in the sky, I would like to clarify one issue: there is a tendency for us to think that since we have invented a machine that flies, we have conquered the sky. This notion flows from a false assumption that people are at odds with their environment. As Bauer (1980) says:

The airplane does not "conquer" the sky but rather uses the properties of the environment, accommodating to it. (p. 45)

When we make the assumption (which is easily made in Western thought) that we are creatures apart and separate from our physical environment, we fall in the trap of thinking of everything in linear and sequential terms (Jacknickel, 1984). In flying, nothing is wrestled from an unwilling universe. The airplane must cooperate with the atmosphere; it does not change the sky, the sky is the same after we use it as it was before we used it.

Saint-Exupery (1939) gave his thoughts:

And thus, also, the realities of nature resume their pride and place. It is not with metal that the pilot is in contact. Contrary to this vulgar illusion, it is thanks to the metal, and by virtue of it, that the pilot rediscovers nature. As I have already said, the machine does not isolate man from the great problems of nature but plunges him more deeply into them. (p. 66)

It is only when pilots abuse some aspect of their environment and their relationship with it that it is thrown out of balance and nature will seem to turn against them.

Perhaps part of the attraction of the sky is the fact that we are not supposed to be there. Birds are the only living creatures that really belong there. As MacMillan (1985) put it:

Perhaps whatever the quality is and I think it is something to do with the fact that the only way any of us can operate in that particular environment is to hop in an airplane and get up there.

The Wind

Neil: What kind of weather are you concerned about?

Andrea: Cloudy weather, or if it was raining a lot or snowing a lot. Anything that would reduce visibility or if it was really cold I think it would be dangerous. Or if it was really windy it would be dangerous.

There is little doubt that the wind is one of the most difficult variables for student pilots to contend with. Andrea became more aware of wind when she started flying. A calm day was not just a calm day anymore, but rather it became a great day for flying. Windy days were never good days for flying. Andrea comments:

I don't feel confident doing circuits in heavy winds. The cross winds scare me the most.

When I asked Andrea specifically what influence the wind had on her flying she replied:

Well, it just makes it harder to stay at the proper altitudes in the circuit and at the proper distance away from the runway. It makes it harder to get yourself lined up to the runway when you're just learning how to land. You have all those things running through your mind about what you have to do and you're watching the strip and making sure you have a point picked there and that it's not moving up and down your windshield. You're checking everything and you're making sure it's not going too fast. You want to make it a decent landing. You're trying to control the plane. It's really nerve-wracking to have gusts of wind blowing you from side to side at the same time.

Andrea found she was always tense when flying in the gusty wind conditions. She had the feeling that it might "blow me over" and she found that she had to work harder at

flying. She also felt that almost anyone could land when there was no wind. The velocity of the wind was a prime consideration.

Right now it doesn't really matter what direction they (wind) are coming from as long as they are not too fast. If they are saying 300 at 25 then I'm going, "Oh God, 25." Then I would call back and make sure I have the direction right because if the winds are coming right down the runway then it's not so bad because I did my first solo in that twenty knot wind. If it looks like a crosswind, then I get nervous.

The other adjustments Andrea had to learn were compensating for strong headwinds on landings and during cross country flights (pilots hope for tailwinds on cross country flights). Andrea comments:

I knew I had a headwind but I really wasn't sure how I was going to cope with it. David said if you have a wind component like 290 degrees at 23 you just divide it in half and add that to your approach speed. That really worked out well.

There is more to be said about the wind and its affect on flight than I have space for here. No doubt, the wind and its influence on the world at large would be a fascinating study on its own. If you want to learn the most intimate of all the secrets of the wind you must of course take up gliding. We will leave the wind with a story told by Murchie (1954) who views the sky from a pilot's perspective in his book Song of the Sky.

Tibet of all the inhabited lands is probably where the wind feels most at home. The thing I remember most about the Tibetan mountains was the wind. . . a howling, skin-blasting roar which never died for a

moment throughout the day. So bad was it that if anyone had anything to say, he got it said before morning. After that there was no conversation.
(p. 169)

Cloud

Murchie (1954) gives this description of clouds:

If the wind is the spirit of the sky's ocean, the clouds are its texture. They are embodied imagination, the sheet music of the heavens, the architecture of moving air. Their's is easily the most uninhibited dominion on the earth. Nothing in physical shape is too fantastic for them. They can be round as apples or as fine as string, as dense as a jungle, as wispy as a whiff of down, as mild as puddle water, or as black as the belch of a volcano.
(p.179)

Cloud cover is another major factor pilots must consider before a flight. The ceiling (height of cloud base from the surface of the ground) must be within legal limits. The frustrating thing about flying is that the movement and formation of clouds is beyond the control of pilots. (Even the space shuttles wait for clouds to move.) Pilots fly when the clouds allow them to fly. The alternative to waiting for clouds is to fly through them as instrument-rated pilots are licenced to do. This kind of flying requires special training and special instruments in the aircraft.

Andrea found she became more aware of cloud formations after she started flying. The clouds (and wind) controlled her flying. She gives the following example:

If it looks like it's going to be a five thousand foot ceiling and the leaves are just rustling in the trees, I feel it's safe to go flying.

Although Andrea said she often looked up to see what

kind of clouds were building she felt she didn't really get too much training in this area during her private pilot course. MacMillan (1985) agreed with this observation:

I would say that one weakness in general is that people are not taught enough about metrology. I believe that has to be true with the number of weather related accidents.

The alternative to flying under the cloud, as mentioned earlier, is IFR flying through the cloud. (This of course is not an alternative for a VFR pilot). Clarke (1984) gives the following description of one of her IFR flights:

I flew back from Saskatoon, IFR all the way, and I swore that once I got down I could see the imprints from my hands in the control column. I was sweating bullets. I thought, "That's it, I'll never go out in bad weather again."

Even the high time instructors admit that flying through clouds is not always fun. Gwilliams (1984):

Now I can go down to two hundred feet (ceiling) and half a mile (forward visibility) coming in across down town. That's scary. It's really scary when you watch what's happening. You're following that three degree glide path down and when you break out at two hundred feet you've just got time to pull the throttles and flare. It's that quick. If you're not on the money, boy you're going to miss it.

Probably one of the most entertaining parts of flying is being above some puffy clouds and just "playing" with them for a while. The pilot gets that feeling of speed even though he/she is high in the air and finds something very fascinating about moving a wingtip through a puffy cloud while speeding thousands of feet above the earth. What should never be forgotten is that a non-instrument

rated pilot who flies into a cloud will almost certainly become disoriented and spin out of control. Clouds kill. During the course of this study, nine people were killed in light aircraft accidents in the area where Andrea flew. All the accidents were a result of pilots flying into deteriorating weather conditions, entering cloud and crashing. Although the death of fellow pilots is never easy to accept, the lesson to be learned from most of these tragedies is to stay clear of cloud and never get trapped under low cloud with no where to go. As Andrea said: "Clouds can be very unforgiving."

Turbulence and Vortex

The quality of one's flying is directly influenced by the quality of the air. There are times when the ride in a light aircraft is as smooth as silk. Other times the pilot might compare the experience to riding across a plowed field in a three ton truck at full speed. Evidently next to cross-winds, turbulence was the most annoying factor in Andrea's flights.

We went out at one o'clock in the afternoon and it was quite turbulent. I was frustrated by the end of the lesson. It was so bumpy and I found the plane was very unpredictable.

A second concern Andrea had was hitting the wing tip vortexes of heavy aircraft that had just landed. Student pilots are warned about these vortexes and fear the day they will be cleared to land behind a Boeing.

Andrea describes one of her experiences.

I turned on to final and there's a big aircraft just setting down . . . just landing. I didn't adjust my glide path enough and ended up landing pretty well where he did. When I was just a few feet off the ground, it (her Cessna 180) went crazy. I saved it okay ... well, it was a pretty hard landing ... it just sort of went clunk.

Andrea came to realize that part of flying was getting bounced around in turbulence. She did admit that she did not think she would ever enjoy flying in light planes "when it's really, really bumpy."

Storms

No doubt, the key to survival as a pilot is being able to judge when the weather conditions are beyond your flying skills or your aircraft's capabilities. On a blustery January morning, a pilot and his wife set out to visit friends in a neighbouring town. They were warned of deteriorating weather conditions but chose to continue. Shortly after, the pilot lost control of the aircraft in a snow shower and crashed, killing himself and his wife.

Andrea was acquainted with these people and thus their sad demise became a part of her flight training experience.

As Andrea said:

They tried to fly through a cold front. It was forecast two or three hours before they crashed.

David had spoken to several people who talked to the pilot and his wife just before take off.

They were standing on the ground just before they took off looking in the direction of the flight. The sky was just black.

Student pilots are told time and again to stay clear of anything that looks like a storm. Probably one of the most violent storms (next to a hurricane) that could be encountered by a pilot is a thunder storm. I write this account of Murchie's (1954) recognized facts about thunderstorm flying, not because Andrea had a lot to say about thunderstorms but to reinforce in all pilots who might read this study a respect for the verocity of these storms:

1. flight below the storm usually encounters violent updrafts and downdrafts, heavy rain, hail, and possible lightening,
2. the blackest part of the storm is safer from lightning but still has dangerous vertical winds,
3. flying just below the freezing level attracts the most lightning,
4. above it, icing,
5. better over it than under it assuming you can fly high enough,
6. it is better to pass to the right of a storm in the northern hemisphere.

(p.207)

Chapter VI

SPACE AWARENESS

Cockpit Space

Saint-Exupery (1939) gave a description of the cockpit of his airplane as he set out on a flight from Paris to Saigon in 1935:

There is a particular flavor about the tiny cabin in which, still only half awake, you stow away your thermos flasks and odd parts and over-night bag; in the fuel tanks heavy with power; and best of all, forward, in the magical instruments set like jewels in their panel and glimmering like a constellation in the dark of night. The mineral glow of the artificial horizon, the stethoscopes designed to take the heart beat of the heavens, are things a pilot loves. The cabin of a plane is a world unto itself, and to the pilot it is home. (p. 177)

As a student pilot Andrea had not yet come to feel at home in the cockpit. It is important for pilots to become very familiar with the location of the various instruments and switches so that in case of an emergency, the correct procedures can be followed quickly. For example, in the case of an engine failure, the pilot must know where the fuel selector is, the fuel pump switch, the master switch, the starter button and so on. Nixon (1984) tells of a situation he encountered when he was attempting to dock a Cessna 185 float plane in strong winds:

The guy on the dock couldn't hang onto the wing any

longer. I had to hop in and start the plane before it smashed the tail into the dock. I was only ten feet away and we were drifting backwards quickly. Sometimes those fuel injected engines take a long time to start when they are hot. I knew I was within about two feet of the tail being crushed. In my mind I forgot the pressure of the moment very deliberately. Everything just slowed down for that instant and I was aware of everything that had to happen. I moved along the panel from one side to the other and went through all the procedures. The plane started and I pulled away from the dock with only seconds to spare.

A great deal of planning is undertaken by the manufacturers of aircraft to ensure that gauges and switches are placed in the most obvious or accessible locations. Nevertheless, there is always the pilot who retracts the landing gear while the aircraft is still on the ground.

The cockpits of light aircraft are relatively small. Two average sized people will likely be "rubbing shoulders." The smallness of the space makes some pilots feel rather confined, however, other pilots claim it gives them the feeling of being more a part of the aircraft. It is interesting to note that car manufacturers have been comparing some of their models to aircraft. It has been suggested that the instrumentation is similar to that of an airplane and that some of the structural features (doors) are similar to those of an aircraft. Few pilots feel that cars in any way resemble or perform like aircraft.

Airplane Space

Training aircraft occupy a considerable amount of space on the ground. Andrea was concerned initially about being able to move the aircraft around on the ground without coming

into contact with other aircraft. The most spectacular example of invading another aircraft's space is the mid-air collision. Unfortunately, mid-air collisions occur all too often. Although Andrea never came close to a mid-air, her instructor had experienced several near misses.

The first one was where an aircraft was overshooting and overshot right over top of us. If I had picked up on the radio that something was going on and dived down, we probably would have hit.

The second one was this fellow who was cleared in on a downwind leg. Suddenly, there he was right beside me. I could see his sunglasses. I did a steep turn to avoid him and we rolled out side by side and he hadn't moved an inch.

Ground Space

To the student pilot, the movement of aircraft on the ground can appear somewhat chaotic until the simple system of runways and taxiways is understood. As Andrea said:

It was confusing because I couldn't understand. I don't know where anything is, like runways at all. I don't know where anything is, like runway 34, it could be in another city for all I know.

As was mentioned earlier, aircraft are not particularly graceful on the ground. Aircraft are made to fly. Andrea spoke of some initial difficulties she had taxiing the airplane:

The thing I find hard about taxiing is doing tight turns. Sometimes when I stop, the aircraft tends to want to go to one side or the other, it doesn't want to stay straight.

Of course part of taxiing is knowing when to stop and go on the ground. In the excitement of her first solo Andrea made the mistake of calling the ground controller too soon.

As she said:

They told me next time I should go past the yellow line before I called ground.

There is a certain orderliness to movement on the ground.

It is important that student pilots learn their place in the various routines and learn some basic rules like "you always let the big jets go first."

Flight Space

Dimensions

Three Dimensionality

Gymnastics and flying have something in common. They both involve movement around three axis of rotation. They are also both dangerous to perform if you don't establish "which side is up" before you land. One of the first demonstrations that Andrea received of this three dimensional movement was when she did stalls and spins and in her own words: "they were really bad, I was really nervous."

Although there is little carry over of learning between flying and driving, student pilots have a tendency at the beginning stages of flight training to react as if they were in an automobile. The first example of this would be turning the control column when attempting to turn the aircraft on the ground. The column of course has no effect on ground manoeuvres other than assisting in winds. Andrea gave another example of her carry over from driving:

The first time my instructor demonstrated the spin to me I was pumping imaginary brakes on the floor, hanging onto the seat and shutting my eyes.

In an earlier section I discussed the notion of the natural pilots. At that time Engel (1984) commented that a natural pilot would probably be comfortable in three-dimensional movement. Here are some further insights he gave on this topic:

A person (the natural) is at home in the three dimensional . . . I would think you would find natural scuba divers that work in liquid three-dimensional (space). The astronauts obviously have to be comfortable in the third dimension. We would find in the basic training that sometimes you would almost have to tell a person that they weren't straight and level, that they were going straight down (laughs). They would almost not have any sense of where they were in this third dimension even though it was a bright blue day and there were trees going by (laughs).

Being comfortable in three dimensional movement is a phenomenon that merits further consideration. For example, it would be interesting to consider the relationship between three-dimensional movement on land and in an aircraft. Do gymnasts and divers have a "special gift" that allows them to orient themselves in space? Would elite gymnasts develop the depth perception necessary in landing an aircraft sooner than non-athletes?

Verticality

I saw the Lord sitting upon a throne, high and lifted up and his train filled the temple. Above it stood the seraphims: each one had six wings; with twain he covered his face, and with twain he covered his feet, and with twain he did fly.

Isaiah

The idea of people flying is not a new one and of course the fascination with heights may be an inherited feature of our anthropoid ancestry. Ironically, many modern

day pilots have told me that they are not particularly comfortable at great heights (outside of flying) and several admitted they were actually scared of heights. The fact of the matter is that "height is your friend" as a pilot. An elderly bush pilot once told me: "Fly as high as you can because that way if your engine quits you have more time to decide where you want to hit the ground!" Andrea made the following comments about gaining altitude on take off:

It's good to get a lot of altitude on take off as quickly as possible. It's partly for safety but mostly it is because then I get that "bird's eye" view.

The altimeter (if set correctly) lets the pilot know how many feet the aircraft is above sea. Next to the airspeed indicator this instrument is probably the most important for pilots. The pilot must determine by means of charts or guides what the elevation of the destination airport is in order to know at what altitude to enter the circuit. Additionally, pilots must fly at even altitudes plus five hundred feet when flying westbound and odd altitudes plus five hundred feet when flying eastbound.

I was interested to know when Andrea developed that sense of becoming aware of the distance from the ground on landing. Nixon (1984) and others spoke of "feeling for the wheels" to contact the runway. Andrea commented:

I don't think I have too much awareness of that right now. I am busy making sure my airspeed doesn't decrease, making sure my angle of descent is

proper, that my nose isn't too high or low, that my glidepath is right. I am watching for airspeed changes and the right time to adjust the power. I am so busy doing all those things that I don't watch my height that much.

Verticality, as an element in flying is what allows the pilot to see the world in a different way. The higher you fly the farther you can see. On a clear day you can see a hundred miles at an altitude of 10,000 feet. Just imagine being able to do a three hundred and sixty degree turn and see a hundred miles in every direction. The flying I speak of can transport us, not just from place to place, but between different levels of experience (Bauer, 1980). When we leave the world behind, we leave our past behind. Flying happens in the here and now. Our only bonds to the earth are the radio and the panorama we have in front of us. Verticality, is the feature of flying that allows us to suspend the psychological bonds to the world while we are in the air. The everyday mode of rational, reductionist thinking flies out the window in an airplane (if you let it). Bach (1983) speaks of this occurrence:

As he learns to fly, the pilot discovers that the cars down there are toys, after all. That the higher one climbs, the farther he sees; the less important are the affairs and crises of those who cling to the ground.

From time to time, then, as we walk on this little round planet, it's good to know that a lot of that way can be flown. We might even find, at the end of our journey, that the perspective we've found in flight means something more to us than all the dust-mote miles we've gone. (p. 90)

It is altitude that makes flying flying. When an aircraft is flown at high speed near the ground one has a similar sensation to driving a race car. It is when you pull back on the control column and see the world drop away beneath you; then you know that you are really flying. I believe that a large part of the attractiveness of flying is having the power and freedom to leave the world behind you.

Landmarks

A landmark of course is a conspicuous object on land that marks a locality or is used as a point of orientation. Pilots use landmarks to verify their locations. When a pilot is flying and is unable to recognize any of the surrounding landmarks, he of course is lost. (Being lost will be discussed in the next section.) Maps, radio aids and common sense are supposed to keep pilots from getting lost. Some pilots unfortunately fly with an absence of all three! I was curious to know if being transported in and out of the city in an aircraft would cause Andrea to be disoriented. She had driven in and out of the city many times and was never lost. Andrea explains:

I did lose my bearings a little bit. We sort of turned and fooled around and things like that and I didn't quite seem to know where I was. Eventually I saw the downtown core and I looked at the compass. David pointed it out to me.

There is probably no substitute for experience when it comes to map reading on a cross country flight. Because the map is just a symbol it is possible to mis-read it

quite easily. Most experienced pilots claim you should use three features of the landscape to verify your position on a map. After being in the air for a while, it is easy to "see" something that doesn't really exist. In other words, we want to feel we are on course so badly that we lie to ourselves. Andrea became confused with some of the landmarks from time to time:

When I came back I called advisory and told them I was over Stony Hill and I really was over Spruce Hill. I always get those two towns mixed up.

Andrea did not receive instruction in radio navigation and therefore I will not discuss it in this study. I would like to add, however, that many low time pilots get into trouble when they rely on radio navigation instead of pilotage skills.

Being Lost

On one occasion Andrea and another pilot got lost on a night flight. (This same pilot killed himself in an airplane crash three weeks later.) As she described, the first indication she received that they were lost was that:

He seemed a tad flustered about finding the airport. He gave me the map and said you better make sure you point it in the right direction.

At this point in her flying career Andrea had only ten hours experience in the aircraft and therefore was unable to offer much assistance. What often happens when one gets lost is that other factors crop up to further complicate the situation. This flight was no exception. Andrea explains:

He (the pilot) was getting very agitated at this point - very upset, which I could sort of understand...I mean we were lost at night! We were somewhere between Nightcourt and City Airport but we didn't know where. Then we ran into cloud. So he started a descent right through the cloud. (He was not instrument rated.) Our passenger in the back seat was leaning over and I said, "Is your seat belt fastened?" He said, "No, I guess I should fasten it." It was a good thing because we were bounced around a fair bit going through the cloud.

Andrea's flight ended without incident, however, many others do not. One of the obvious problems is that while the pilot is trying to identify his location, the aircraft is burning off fuel. The only thing worse than being lost is being lost and being low on fuel.

Distance

There are many ways distance can be viewed in flying but one of the most significant ones is the runway. Runways vary in length and width but one thing is for certain they have finite dimensions. When you run out of runway, you better hope the aircraft is flying! As David, Andrea's instructor so aptly put it, "the runway behind you is no good to you at all!" (1984). On many occasions Andrea commented that she had a spot picked for her landing and she liked to "nail it on the button" using the least amount of runway space.

Flying in the circuit is an excellent illustration of the importance of being able to judge distances. The aircraft must be kept a certain distance away from the runway and of course a certain altitude off the ground. Andrea spoke of how she judged these distances:

When I'm one third or one half the way downwind, I start doing my checks. When I'm more or less lined up with the tower - when I can look out the side window and see the tower then I call them and tell them I'm downwind.

Distance will be discussed further in the following section on speed and in a later section on the experience of time.

Speed

Flying involves developing an awareness for a variety of different speeds. Some of the more critical ones are stall speeds, approach speeds, cruise speeds, ground speed, and of course wind speeds. In flying, the pilot is either trying to gain speed, maintain speed or lose speed. Speed of course is directly linked to time (and distance) as the faster we fly the less time enroute and the less time we have to make decisions. Andrea explains some of the speed considerations she has to make:

I like to start slowing it down fairly far back. The airspeed should be pretty well steady by the time you start your approach. I am trying to maintain my airspeed during the approach. I want to follow the glide path and lose altitude at a constant rate of speed.

Andrea had difficulty maintaining a constant approach speed. She was concerned about coming too close to the stall speed and as a consequence used to "smoke it in at eighty knots."

During the take off phase of the flight, Andrea was taught to focus her attention on her airspeed. Pulling the nose too high causes the airspeed to dwindle and hover dangerously close to the stall speed. Andrea comments on

the cues she uses to ensure that she has the correct climb attitude:

Well, for one thing - I can't see well out of the windshield, you know your nose is high. I am making sure my airspeed is about 75 knots. When I'm at 75 knots airspeed and good climb attitude, which means I'm really climbing and I get to 2700 feet, I make my left or right hand turn.

Those pilots who claim they fly light aircraft to get somewhere (most fly for fun) speak of the great speed advantage. This is true of course, as the average light aircraft goes two to three times as fast as a car. Clarke (1984) points out another reassuring feature:

You can go that fast and never have to look out for the cops behind the bushes.

A common observation of student pilots is that they don't really feel the speed of flight. Indeed, an aircraft gives the sensation of going fast only when it can be compared to stationary objects which are in close proximity. My experience in interviewing pilots about the sensations and reactions they encounter is that often they are so engrossed in the event that they have cleared their mind of all thoughts. Flying becomes a kind of mantra.

Captain Harry Armstrong once made a delayed-opening drop especially for the purpose of observing his sensations and reactions. The following is his report:

During the few seconds preceding the jump the predominant mental factors were fear and excitement ...Throughout the free fall all conscious mental processes seemed normal. As soon as the airplane was cleared, fear and excitement disappeared.

Perception of an auditory nature may or may not have been impaired. While twelve airplanes were in

close proximity...no noise can be recalled.

Visual perception was normal...

During the third and fourth seconds the eyes were voluntarily closed, and during the time all sense of motion was lost. The sensation was that of being suspended in midair.

There was none of the empty or "gone" feeling in the abdomen so common in elevators and in airplanes...Breathing was even, regular, and undisturbed.

The last phenomenon...has to do with skin sensibility and was a result of the increased air pressure on the lower surface of the body.

It consists of that force which restricts terminal velocity to 119 m.p.h. instead of infinity, and appears in consciousness as a very gentle, evenly distributed, generalized, superficial pressure on the surface of the body toward the earth. The nearest possible similar earthly experience is that of being lowered gently into a great bed of the softest down. (Murchie, 1954, p. 291.)

I wish to use this quote for several purposes. Firstly, it gives a detailed account of one person's sensations when experiencing speed. Secondly, it is an example of what Geertz (1973) would call "thick description". The person describing the event was also participating in the event, a full participant.

Movement in Space

Sharing Space

Although there is a great deal of freedom to explore space as a pilot, one of the first rules Andrea learned was that she was sharing the space with other pilots. "Looking out for the other guy" is an important part of student training. Andrea started looking for other aircraft even before she got to the airport.

If I see somebody flying I look at what direction he is taking off so I can get an idea which runway they might be using. This way I get some information

ahead of time. When I'm coming up King Street and somebody takes off, I say, "Humm, they are using 16 this morning."

An important consideration in sharing space is knowing how to enter and depart from airports without conflicting with other aircraft. Part of the difficulty is spotting the traffic you are assigned to follow.

Finally I saw him. It was really strange, I knew I had to follow this guy in. I just kept looking until I saw him and the ATC called me and said to "keep it in tight" because there was someone else wanting to come in.

Engel spoke of the early days of navy flying when there really wasn't any aircraft that could compare with the high performance naval fighters. One of the attractions of flying under those circumstances was that they really didn't have to share space with anyone else. The advent of jet engines brought that period of history to a close. Engel (1984) explains:

(Later the fighters had to compete with) something that's also transversing the continent at the same speed, so they're going to have to take their little slice of the airspace and stay within it and lose really a lot of the freedom of the skies.

Routines in Flight

Many pilots say they go flying to get away from the boring routines of everyday life. The fact of the matter is that flying is heavily routinized. Andrea gives an example:

I reached 2700, turned to heading 270 and called advisory on 118.8. Most of my energy was spent trying to keep everything coordinated in the aircraft.

Nixon (1984) claimed that the key to safe flying was consistency. To illustrate his point he compared flying to golfing (he was an expert at both):

In golf you have to groove a swing and that swing has to be identical over a long period of time. The game may last three to four hours. Your body has to be able to maintain that swing. After many years of golfing you get that control. You can't get excited or have mood swings. Flying also takes a lot of discipline and you have to establish a routine if it's going to be safe. You have to perform the landing over and over again and the same way. If your procedures are always the same you should be able to land on a thousand foot or five thousand foot strip, whether it's stressful or just routine conditions.

As Andrea became more proficient in her flying skills, the routines that once baffled her started to fall into place. The following is an example of her pre-landing routine:

I make sure I'm at the proper altitude, keep my airspeed up, do all my pre-landing checks; this includes master, mags, fuel pump, fuel tanks, flaps and trim; then I call the tower, turn base and concentrate on the speed and angle of my final approach.

Needless to say, the routines involved in VFR flying are minimal compared to instrument flight.

Pathways in Space

If flown under normal circumstances (not aerobatic) aircraft move through space carving curved and straight pathways. Pilots who are able to move an aircraft through a turn smoothly are generally considered more proficient than those who "kick" the plane through a turn. The first pathway a student must become comfortable with is the circuit. A circuit involves taking off; climbing five hundred

feet; turning ninety degrees in the cross-wind leg while continuing the climb to 1000 feet above the ground; turn ninety degrees again onto the base leg and finally making a fourth ninety degree turn onto the final approach for landing. The turns of course are all made either to the left or to the right. For a student pilot, the circuit seems to take place very quickly. Andrea explains the predicament:

It is an overload when you are doing circuits. You want to make sure that you get into each lane properly, and you don't want to turn too steeply. I never know exactly when to turn base. Either I turn too late and swing out wide or I turn too early. Both ways I screw up my approach.

Of greater concern to Andrea was how to enter the circuit as she flew in from an outside point of departure.

I don't really know how to enter a circuit, when you call and say you want to land, call advisory and say you want to land and they tell you to enter a circuit at a certain point and what not. I'm really fuzzy on that stuff.

One of the problems Andrea encountered was that on most of her flights she used the same runway. She became accustomed to the routine of setting up her approach to the circuit the same way, using the same landmarks as reference points.

If I could use the same runway everytime that would be fine. I have trouble finding the runway and then figuring out how to get into the circuit. If I knew how to do that, it would save a lot of confusion because I start getting uptight when I realize I'm not really sure where I'm going. You see I'm really comfortable with runway 26 because I know exactly how to get there. I'm not so sure about all the others. They hardly ever use runways 12 or 16.

The other change in routine that threw Andrea off was then the air traffic controllers gave her a clearance she did not quite expect. After flying in and out of the same airport repeatedly, one begins to expect the same clearance.

Andrea describes one of these incidents:

I was over the cement plant and I called them (tower). I thought for sure they would clear me downwind, and I had planned to go downwind. They cleared me for left base, and I proceeded to downwind, and David said, "No, no!" and I said to David, "How am I supposed to get to left base if I don't go to downwind first?" I guess I have been getting in and out of the circuit any old way.

Entering the circuit seems to be one of the most stressful experiences for student pilots. The difficulty arises because they are faced with remembering a procedure which is based on abstract terminology (eg. left base); identifying the correct runway; looking out for other aircraft and keeping the aircraft under control. As Andrea put it:

When we first started doing circuits I was so confused on the first one I didn't even know where we were going. The second one I started to know where we were going.

Cross country flying is by far the most enjoyable part of flying. Andrea did not have many opportunities to participate in cross country flying as a student pilot, however, she completed many cross country flights with me. Several of these flights took place at times when her enthusiasm was fading. Most of a student's training is work and there is little opportunity for "free play." Cross country flights follow designated pathways (routes) and

these pathways are generally straight lines between airports, cities or radio navigation aids.

The pathways used to leave an airport are assigned by the air traffic controllers.

I know that when I get off 34 or 30 they are going to say, "Heading 270 degrees, advise when at 4000."

Another critical pathway is the glide path that is followed to land the aircraft. The accuracy of the landing is largely dependent on the consistency of the approach.

Once I'm over the runway, it's too late to worry about the approach. Getting a consistent glide path is the difficult part.

The aircraft moves around three axis while in flight. This special quality allows the pilot to explore a great variety of movements in space. A turn in a car is nothing spectacular; however, a turn in an airplane reveals an unobstructed view of a landscape that stretches out for as far as the eye can see.

Preparation for Flight

Well you go out to your plane and you do your walk around and test your fuel and you then climb in. You start the engine and you make sure that everything checks off. You listen to ADIS, set your altimeter, radio for taxi clearance and then you taxi. Then you do your run up, (Andrea).

The average checklist for a single engine aircraft includes seventy-five items. Checklists are used because unlike the driver of a car, a pilot cannot pull over and check the engine if he/she hears a strange noise. Once the aircraft is flying, the pilot has made a commitment. The pilot has made a decision based on a pre-flight inspection

that the aircraft is safe to fly.

There is a tendency by some student pilots to take the walk-around too casually. If you watch an owner-pilot, she/he might take twenty minutes checking for loose rivets, oil leaks and other indications of problems. Preparation for flying also means making certain you have all the necessary flight planning completed before you take off. It is important to know exactly what you can expect to see enroute and what the layout of the destination airport is. The final item in preparation is making certain you as a pilot are fit to fly. Perhaps we should have pilot checklists the same way we have aircraft checklists?

The Take Off

Take Off

The winged bull trundles to the wire perimeter
Cumbrously turns. Shivers, brakes clamped,
Bellowing four times, each engine tested
With routine ritual. Advances to the runway.
Halts again as if gathering heart
Or warily snuffing for picador cross-winds
Then, then, a roar open-throated
Affronts the arena. Then fast, faster
Drawn by the magnet of his "idee fixe",
Head down, tail up, he's charging the horizon.

And the grass of the airfields grows smooth as fur
The runway's elastic and we the projectile;
Installations control-tower mechanics parked aeroplanes-
Units all woven to a ribbon unreeling,
Concrete melts and condenses to an abstract
Blur, and our blood thickens to think of
Rending, burning, as suburban terraces
Make for us, wave after wave.

C. Day Lewis from An Italian Visit

The above description is one that we can relate to as passengers on large aircraft. Single engine aircraft are hardly "winged bulls," as a matter of fact they are more

like sensitive kites. Saint-Exupery (1939) gives another description of a take off:

He feels the ship charging itself with power as from second to second it picks up speed. He feels the development, in these fifteen tons of matter, of a maturity that is about to make flight possible. He closes his hands over the controls, and little by little in his bare palms he receives the gift of this power. When his power is ripe, then, in a gesture gentler than the culling of a flower, the pilot severs the ship from the water and establishes it in the air. (p.72)

Of course, Andrea's first take offs were somewhat more abrupt than the "culling of a flower." Before her first flight she expressed some ideas about what she was anticipating:

I don't think there is a lot to do. Maybe it seems like a lot when you don't know all the steps. You increase power and you have to try to keep the plane from steering off the runway and you have to get the plane into the air. I guess I would pull back on the column to get the nose up.

Andrea was very excited after her first flight.

I was interested in Andrea's reaction to the take off and when I asked her if she thought the aircraft took a long time to get in the air on the take off roll, she replied:

No, it was pretty well what I expected, it was a short take off roll. We weren't on the ground very long. I thought for some reason we would be on the ground longer.

Most student pilots express a considerable amount of amazement that the plane actually flies at the end of the take off roll. Andrea comments about one of her take offs:

Well, I don't really have time to think. I get into the aircraft, call advisory, I'm busy, I'm attending

to my aircraft. I'm just thinking about what to do. I'm not thinking about anything else. I am thinking about checking the aircraft out, calling ground control, telling them what I'm doing, what I want to do, waiting for the clearance; doing my runup, checking everything out and getting clearance to take off.

I take off and wait till I get to 2700 and then call advisory as I turn to my heading.

It's always a thrill as soon as the plane leaves the ground and it sort of jumps into the air, or it seems that way to me all the time. It's all very thrilling. It's just a feeling, I can't really put it into words.

Level Flight

When they say my heading is cancelled, I keep going until I get to 4000 feet and then I know I have to level off, so I'm thinking, "Okay, now it's time to level off, I'm at 4000 feet." So it's ... attitude, power, trim.

(Andrea)

The climb to cruising altitude is finished. To make the transition from climb to cruise we lower the nose of the aircraft, reduce the power and trim to take the pressure off the controls. The controls feel light in our fingers. The space between the bottom of the windshield and the horizon remains constant. The vertical speed indicators "stand at attention" pegged on zero feet per minute. We are assured we are in straight and level flight. As Andrea said:

Your should try and keep a fix on the horizon. I tried doing that after awhile. I was always worried that I wasn't maintaining the altitude right on. For some strange reason I thought we were dropping even though the nose was straight (level).

In order to keep the airplane level, the pilot must sweep his/her eyes across the sky and the instruments. When corrections are made, very fine touch should be applied as aircraft are sensitive to control inputs. On clear days, straight and level flight is one phase of flight when the plane almost flies itself. Indeed it is much simpler if the pilot trims the controls (adjust rudder and elevator angles) and relaxes. Level flight is the most enjoyable part of flying because other than scanning the instruments occasionally and navigating, this is the sight seeing portion of flight.

Cross country flights are primarily straight and level flights. The level portion is of course preceded by the climb to altitude, a climb that is limited by cloud bases or licence restrictions. The higher the climb the broader the field of vision. Navigation in straight and level flight is easier to accomplish if the pilot gains some altitude.

It's hard to find where you are when you are navigating unknown territory at low altitude. If you're up to 5000 feet or so, it's not too bad but you go down to 3500 and it starts to get dicey. That's when you start following roads - IFR (I follow road!) (Andrea)

Some instructors have commented that there is an over-emphasis on maintaining exact altitudes which causes student pilots to focus too much attention on the altimeter and not enough on what is happening outside the aircraft. Andrea tended to support this when she commented that her solo cross

country flight was one of the few times she looked out the window and noticed the landscape.

The Turn

The turn is the most complex of flying's four basic maneuvers. The pilot must apply coordinated pressures to all the control surfaces so that the airplane will turn at a constant rate, at a constant bank, and at a constant altitude. It's a fine example of classical physics, of Newtonian action and reaction forces in harmony with each other. It's also a symbol of how flying involves a combination of perceptual modes and ways of thinking that we ordinarily think of as diverse and unrelated. (Bauer, 1980, p. 77)

The aircraft rolls into a turn (rotates on the longitudinal axis) because the aileron on one wing goes up and on the other wing goes down. When the aileron goes up it reduces the lift on that wing and causes it to drop. Once the aircraft has been rolled into a turn the ailerons can be moved back to the neutral position and the plane will continue in the turn.

The real elegance of the aircraft is in its symmetry and simplicity. Compared to almost all other modes of transportation they move with very little effort. Imagine how difficult it would be to control an automobile on the road at two hundred miles an hour and yet a movement of the fingertips moves the aircraft in and out of a perfectly sculptured turn.

Several instructors commented that probably the most difficult skill for students to master was the proper steep turn. Andrea commented that she had difficulty mastering the coordinated turns:

He showed me turns and he demonstrated then, fifteen, and twenty degree turns on each side, and then I tried it. I found I kept losing altitude in my turns or sometimes they got too steep. I don't like steep turns.

The Landing

Andrea made the following comments about landing at the outset of her lessons:

For me, I think the most nerve wracking part to start out with is going to be landing. I know there are certain things I will learn to do, but the prospect of bringing that thing down scares me now.

Landing an aircraft requires the integration of many sources of sensory information. The pilot must be certain to maintain a glidepath that will result in the appropriate contact with the runway. Landing is a high stake target game and of course, can only be successfully accomplished when undertaken at airports. There is an old saying among pilots that, "Any landing you walk away from is a good landing." I'm sure insurance companies would disagree with this notion!

The landing approach is not that difficult for most student pilots. The difficulty arises when the aircraft must be moved from the glide, to level flight, to the flare. Bumpy landings often occur when the aircraft is flared too high off the runway and it "stops flying" and drops to the surface with a bounce. In this sense the pilot is "feeling" for the wheels to touch the runway.

Although the landing approach started several miles out

from the threshold of the runway, Andrea often referred to "landing" as the time when the wheels contacted the pavement. Initially her greatest concern was getting the aircraft stopped:

I see landing as being something like going down a hill on skis - getting stopped is crucial. Either you get stopped or crash.

Andrea began to accept that she would not be able to "nail" every landing. Some of the difficulty stemmed from the fact that the verbal explanations of skills were not precise enough. Andrea explained:

I had no idea what to do you know, he kept saying, "Pull back on the levers (control column) more, more, more, you know." I had heard for the first part of the lesson, "Don't throw the controls around so much, use constant pressure." So here I am trying to use constant pressure but not move the controls. He is saying, "Pull the nose up more." I didn't know what to expect and I found the whole thing very confusing.

Those few seconds just before the touch down were very stressful for Andrea. She was waiting herself to see if her approach had been successful. She describes an approach:

My approach was fine. My descent was fine. I had to side slip a bit, that was no problem. It was just that last few feet when I was hanging over the runway trying to decide when I was going to start lifting the nose and wondering when you are going to touch down; that was the part that really terrified me.

There appeared to be a certain feeling of helplessness as Andrea made her first landings. The aircraft is still flying the pilot:

I had this funny feeling in the pit of my stomach just before I was ready to touch down. I knew you had to bring

up your nose at a certain point and I was getting a better idea of when that should be. It wasn't a bad landing. I sort of landed and bounced off the right side of the runway.

Landing involves making fine adjustments to the aircraft's flying attitude right up to the touchdown. Landing also involves closely monitoring airspeed. Andrea describes some of her sensations:

I am trying to maintain 75 knots and then when I come close to the point where I have to touch down, he (the instructor) tells me to pull back on the nose. I really don't know how much to pull at this point and it usually lands pretty hard. I manage to get slowed down enough to put the nose down.

Instructors use a variety of visual cues to help students develop some sense of when to flare in their landing. The landing attitude is of course the same angle as the take off attitude (at the point of rotation). The student is therefore attempting to recall in her mind's eye what she could see (or not see) out the windshield at the time of rotation. If she sees the same "picture" during the flare, she probably is in the correct landing attitude.

I am trying to focus on the end of the runway as I am settling down. I try to look as far away as I can for the first little while because then the ground doesn't move so fast. The thing is you don't have much time.

Later on in Andrea's flight training she developed a better sense of flaring the aircraft, however, this phase of the landing continued to be the most difficult one to judge. Andrea described her progress:

Landings are coming along much better. I still have a tendency to flare too much. Sometimes the airplane wants

to go up a little bit again before it touches down. I don't have that same helpless feeling, like it was landing me. I can anticipate what the airplane will do to some extent.

Throughout her flight training, Andrea struggled with the visual cues necessary to make her landings more consistent. Nixon (1984) spoke of the importance of consistency in landings and Singleton (1978) supported this contention:

The objective of the long training period is not so much to generate a man who can do things at a given level of speed and quality but rather a man who always will do things at this level and will never do them below this level. In this sense a skilled man is a man of integrity and rigid standards of quality. (p. 3)

Andrea's performance could not be called skilled at this time. She was unable to achieve consistently accurate landings. She discussed some of the inconsistencies in her flying:

I cut the power when I get to the base leg. I have trouble keeping that nose high enough, to keep an air-speed of 70 knots because I want to go down (descend) and I feel like I'm too high for some reason ... so I push the nose down and then I gain airspeed. A couple of approaches ended up being too low today. I ended up adding power or I would have landed on the grass.

In time Andrea was able to predict the quality of landings by focusing her attention on visual sensations:

About half way through final approach I can tell if I'm going to be too high or too low. My only concern at that point is making sure that I'm lined up properly and I've got a good air speed and that I'm coordinating airspeed with attitude. As I come out of my approach, the runway starts to flatten out and then I level off and at the same time I'm dropping - dropping - dropping - and then I have to figure (out) the point I have to pull back, just enough so that the rear wheels can touch.

Collins (1984) made interesting observations about the instructor's contributions towards the student pilot's skill acquisition:

... for years I never thought of a flight instructor as a teacher, at least when in an airplane. The role while flying, as I saw it, was to protect the airframe while the student taught himself how to fly. (p.77)

I believe that this philosophy is often followed by flight instructors. By and large, the student must learn to land by trial and error and the instructor takes over only when the landing is out of control.

Devine (1984) objected to the "teach yourself" concept. She felt that the greatest barrier to landing was the student pilot's pre-conceptions about landing.

A lot of them think it is such a big deal that they make it more difficult than they have to. They walk in thinking it (landing) is difficult and you have got to prove to them that it isn't.

Devine's approach as an instructor was to carefully brief her students so they understand exactly what will be taking place in the air.

They have learned descents, they have learned how to stop descending, and the flare would be the only new thing. They know how to bring the airplane into the nose high attitude. Now the only missing thing after is to know when to cut the power.

As was discussed in an earlier section on "flying as a public display," the landing is the most visible phase of any flight. Everyone is an expert on judging landings (particularly non-pilots) and a botched landing is a nasty way for any pilot to end a flight. As Devine said:

They (student pilots) just want to make perfect landings. It is high on their list to make "grease them on" smooth landings, and you will see a smile every time they do.

Beaty (1965) views landing as being a public performance in his description of a landing at London airport:

Wobbling her tail with a self-satisfied little flourish, she left the footlight glare of the thin straight stage of the runway and nosed into the dimly lit maze of the taxi-track ... (p. 114)

The majority of pilots felt that landing was the most difficult skill to learn. Indeed, landing is probably the most complex skill performed by private pilots. The skill requires constant monitoring of many sources of information while under the pressure of time.

Statistically (Winther, 1984) almost half of the general aviation accidents that occurred in Canada between August 1, 1983 and July 31, 1984, happened during the landing or approach to landing. There is little doubt that pilots should approach all landings with caution.

The Solo

The solo flight is an experience where the student pilot must take full responsibility for his/her life. The instructor is no longer present to take over if something goes wrong. Where else can we become completely responsible for our own lives?

There is no choice, really; if we fly, we must accept it. Most of us never had the chance to take control of our

lives this way and can never have the experience of being so self-reliant. In our ordinary lives, on the ground, there are precious few opportunities to do so, and most of us can hardly conceive of the possibility. Our society and the reality it has created simply doesn't allow for it. It's not thought to be possible, so it doesn't exist. (Bauer, 1980, p. 67)

There is an old saying in flying that "It's better to be on the ground wishing you were up there (the sky), than being up there wishing you were on the ground." The message is that once pilots are airborne they can only depend on their skill knowledge, perceptions and judgement to bring the airplane safely to the ground.

The solo flight was a powerful experience for Andrea. Her reaction after the flight was much more emotional than any other flight. The following is a description of her recollections of this event:

I was taxiing over to pick up David (after the flight) and all of a sudden I got this rush of adrenalin and my entire body was shaking, and I had sweat pouring down my back. I could hardly speak. I was grinning from ear to ear.

Andrea's solo flight ended up being quite routine. She concentrated on the tasks that needed to be performed in each leg of her circuit and "took a nice long approach and came down and just greased it on." Interestingly, most pilots remember "greasing on" that first solo landing.

Many others gave me similar descriptions of what appeared to be a very thrilling experience. Clarke (1984) gave the following account:

I was just yelling and screaming at myself all the way around the circuit. I was so excited. "This is it, I did it!" I'm sure if the guys in the tower were watching me, I didn't have my hands on the controls half the time. I was just a dancin' in that airplane. I did the best landing I have ever done, I don't think I have done one that good again. To me that was the highlight of my whole career in aviation, nothing surpasses that.

Many interesting questions could be investigated in the context of solo flights. How does the instructor know the student is ready to solo? How does the student know? Is there any way to simulate the solo flight before it actually takes place? Devine (1984) made the following comments with regards to the questions:

When you (instructor) can sit there and they are going around and around in the circuit and you don't say anything (no need to correct) they are ready for solo. A lot of them are insecure and don't think they are ready so you have to push them. I did have one guy who (I thought) was ready, and I sent him solo, he just scared himself silly.

The solo flight generally has a great impact on the student pilot's self image. Gwilliams (1984) said the "ego boost" often resulted in improved flying skills.

Generally there is a tremendous improvement in their flying skill. Even if they are just safe enough to send solo, and I've sent some that have been that way, it was the only way to get them over the hurdle. I've seen cases where they taxied the airplane out for the solo and were all over the runway. They got their circuit done and they were taxiing about fifteen miles an hour, just straight as a dime. The improvement is unbelievable.

Most pilots, airline to private, can relate to the first solo. This is the moment when the student sets aside that dependence on the instructor. The bird jumped out of the nest.

The first solo flight is a giant step towards becoming a pilot.

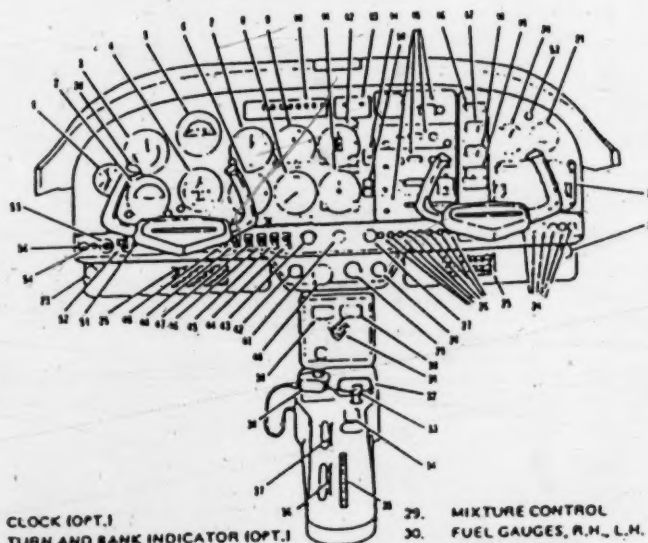
As we have seen, one of the unique features of flying is that it offers the opportunity to explore the boundless limits of space. Pilots who are comfortable with three dimensional movements will very likely feel at home behind the controls of an aircraft. The skillful pilot cuts graceful pathways in space carefully monitoring controls to ensure that the appropriate speed and attitude are maintained during the various flight phases.

The smooth operation of an aircraft cannot occur without a sensitive awareness of visual, tactile and auditory sensations. The skilled pilot becomes a part of his/her airplane, maintaining a sense of harmony by reacting to a variety of stimuli. Flying sensations will be examined in Chapter VII.

CHAPTER VII

SENSATIONS

Vision



- | | |
|------------------------------------|-----------------------------------|
| 1. CLOCK (OPT.) | 29. MIXTURE CONTROL |
| 2. TURN AND BANK INDICATOR (OPT.) | 30. FUEL GAUGES, R.H., L.H. |
| 3. AIRSPEED INDICATOR | 31. FUEL SELECTOR |
| 4. DIRECTIONAL GYRO (OPT.) | 32. ASH TRAY |
| 5. HORIZON GYRO (OPT.) | 33. CIGARETTE LIGHTER (OPT.) |
| 6. VERTICAL SPEED INDICATOR (OPT.) | 34. FLAP SWITCH |
| 7. ALTITUDE | 35. TRIM TAB CONTROL |
| 8. TACHOMETER | 36. TRIM POSITION INDICATOR |
| 9. ADF INDICATOR (OPT.) | 37. FLAP POSITION INDICATOR |
| 10. RADIO SELECTOR SWITCH (OPT.) | 38. MICROPHONE |
| 11. OMNI HEAD (OPT.) | 39. MICROPHONE SWITCH |
| 12. OMNI HEAD (OPT.) | 40. THROTTLE |
| 13. AUTOPILOT CONTROL (OPT.) | 41. CABIN HEAT CONTROL |
| 14. AMPLIFIER SWITCH (OPT.) | 42. CARBURETOR HEAT CONTROL |
| 15. COMM/NAV EQUIPMENT (OPT.) | 43. INSTRUMENT LIGHTS CONTROL |
| 16. AMMETER | 44. LANDING LIGHT SWITCH |
| 17. OIL TEMPERATURE GAUGE | 45. FLASHING BEACON SWITCH (OPT.) |
| 18. OIL PRESSURE GAUGE | 46. STROBE LIGHT SWITCH (OPT.) |
| 19. FUEL PRESSURE GAUGE | 47. PITOT HEAT SWITCH (OPT.) |
| 20. SUCTION GAUGE | 48. NAVIGATION LIGHTS SWITCH |
| 21. HOURMETER (OPT.) | 49. FUEL PUMP SWITCH |
| 22. GLOVE COMPARTMENT | 50. ELT SWITCH (OPT.) |
| 23. VENT CONTROLS, R.H., L.H. | 51. STARTER SWITCH |
| 24. FUSES | 52. MASTER SWITCH |
| 25. VENT LOUVERS, R.H., L.H. | 53. ALTERNATOR WARNING LIGHT |
| 26. CIRCUIT BREAKERS | 54. EARPHONE JACK |
| 27. PARKING BRAKE | 55. IGNITION SWITCH |
| 28. PRIMER | 56. MICROPHONE JACK |

Figure 7-1. Instrument Panel

It is interesting to analyze just how visual stimuli facilitate or hamper the learning process. With a newly-introduced skill, the learner typically attends to too many stimuli and he has to learn to be more selective, which will occur with experience and expert guidance. Too many visual stimuli can be distracting and, in fact, perhaps none are necessary in the beginning stages of learning certain skills. (Singer, 1972, p. 232)

Andrea was overwhelmed with the visual stimuli she encountered in her first flights. Pilots rely largely on the sense involving vision and must keep in a state of alertness. It is necessary to have regular sensory stimulation in order to maintain sense acuity. Andrea was unable to selectively attend to her surroundings and found it difficult to disregard irrelevant cues. For example she found herself scanning the vertical speed indicator as a means of maintaining straight and level flight instead of using the horizon as a perceptual marker.

The visual information the pilot receives during flight is gathered from either inside or outside the cockpit. Inside the cockpit, color becomes significant as a means of communicating information. For example, the airspeed indicator has color coded markings on the arc of its display:

- White arc - flap operating range
- Green arc - normal operating range
- Yellow arc - flying must be conducted with caution and only in smooth air
- Red arc - maximum speed for any operations

The tacometer, oil temperature, fuel pressure and oil pressure gauges also have similar color coding:

- Red line - minimum limit
- Green arc - normal operating

Yellow arc - caution range
Red line - maximum limit

Andrea commented that her initial preoccupation was with the cockpit space and some visual cues given to her to assist in establishing a landing glide path. Many other comments pertaining to visual stimuli have been included in other sections of this study. Pilots often spoke of the magnificence of sunrise and sunsets from the air. Another exciting visual display is the pilot's first night flight.

Flight is not possible without vision. The pilot must interpret the symbols on the ground in order to navigate. The pilot must view the horizon or the instruments in order to maintain flight control. An excellent illustration of Andrea's initial heavy reliance on cockpit visual information is displayed in the following conversation:

Neil: What would make you abort a take off?

Andrea: Well, if I found the engine RPM's weren't high enough. If something was wrong with the power, I definitely would abort.

Neil: How would you determine that?

Andrea: I'd look over at the gauge (tacometer) and if it wasn't high enough, I'd check the mixture. If I forgot to set it full rich, I would do that.

As Andrea progressed further through her flight training she became more aware that her landing difficulties were largely due to focusing her attention in the wrong location.

I was looking inside too much and I should be looking outside more. Looking outside corrects a lot of the problems. Then when I concentrated more on looking outside I found I was looking right up the nose of the airplane and right in front of it instead of looking farther down the runway.

A part of the difficulty many student pilots encounter is the general lack of forward visibility there is in many light aircraft. The instrument panels of many light aircraft tend to cut off the view substantially. Andrea often commented that she didn't feel she could see well enough. In fact, when the aircraft was placed in the touch down attitude she had difficulty seeing where she was going.

When I can't see the runway any more when I'm looking straight ahead then I start thinking about the touch down. If I pull back too much I can't see the runway anymore and if I don't pull back far enough I don't have the proper landing attitude.

Another important use of visual cues in flying is as a means of determining when to make various turns in the circuit or when to set up for a landing. Many pilots keep the runway just outside the wing tip on their downwind leg and turn on their base leg when they can see that the runway has just passed behind the wingtip. Andrea explained her procedure:

Well, I sort of look over and start flying along parallel to the runway and I try to estimate the distance that it will take for me to glide. There are power lines and cut lines and stuff like that so I just let a few of them go by and then I turn to the final approach when it looks like I am even with the runway.

It appeared that Andrea had not been informed of some of these fundamental visual cues.

As Devine (1984) emphasized, the key to control was to establish in the student's "mind's eye" where to align it on the horizon during various flight phases. She explains:

I emphasize where the horizon is running through different parts of the airplane during flight. If I want to learn how to land an aircraft that I haven't landed before, I am checking out exactly where the nose is sitting on the horizon at touchdown.

One of the most important factors contributing to flight safety is visibility. Visibility, as was discussed earlier, is largely determined by the percentage of the sky that is occupied by cloud and the height of the cloud bases off the ground. Smoke, rain, snow and other conditions will also reduce visibility. The importance of maintaining good visibility during flight cannot be over-emphasized.

Touch

Although we collect most of our sensory information in flying through visual stimuli, the pilot can react more quickly to touch stimuli. (Singer, 1972, p. 327) The tactile sense is also closely related to the kinesthetic sense which is responsible for informing the body of its conscious changes in position. The ability to detect changes of touch and pressure while flying involves many of the same type of proprioceptors involved in informing the body of changes in its position. The more the pilot "becomes a part of the aircraft," the more he/she would be able to "feel" the air-

craft's movements and correct any undesirable motion.

The first tactile sensations Andrea had to deal with were the control inputs in the aircraft. How much elevator pressure should be applied by the feet to keep the plane centered down the runway? She found the controls on her Cessna 152 to be "very light." During her initial flight training the most frustrating sensation Andrea had to deal with was the amount of back pressure that was necessary to flare the aircraft when landing.

The only thing I have to worry about now is to develop some idea of how much to hold the nose off the ground, how much back pressure to apply to hold the nose off the ground.

In time Andrea became more attuned to the responsiveness of the aircraft. She was able to describe the changes in the flight characteristics under various circumstances:

The plane lands differently with the flaps down than up. It feels sluggish. It's hard to describe. It feels kind of sloppy. It's not difficult to control but it seems heavier. I guess the drag has increased.

Research has shown us that people who practice reacting quickly, usually have faster reaction times and movement times than those who do not practice. However, reaction times become longer if fatigue has set in or if the pilot is over thirty years of age (Espenschade, 1980, p.304). From this one could conclude that pilots who fly frequently will most likely be able to react more quickly to situations than pilots who fly only occasionally.

Smoothness was a quality that was attributed to most highly skilled pilots. The smoothness of rolling an aircraft in and out of a turn was the mark of a good pilot. Although we typically consider a "smooth" pilot to be one who does all the right things at the right times, a more accurate assessment may be that he/she does not waste time and effort doing the wrong things.

A second meaning of smoothness refers to the quality of the air. The "bumps" in the sky are transmitted to the pilot through the airplane. If the airplane has a rough ride, so does the pilot. The pilot is presented with the sensory information by means of touch (pressure) and kinesthesia and must react accordingly to keep the aircraft under control.

Sound

I learned one thing about speed - that you can gauge the R.P.M. of the engine by just listening to it.

Andrea made this comment after her first flight. In addition to the sound of the engine, the pilot of course is aware of many other sounds. Many beginning pilots and most passengers find it difficult if not impossible to understand the radio communications in aircraft. Part of this difficulty stems from the fact that engine noise often interferes (especially if head phones are not used) and flying "jargon" could best be described as some kind of code. Andrea, like many student pilots, was faced with the double handicap of being unable to hear the transmissions clearly and not being

able to decipher them when she did hear them.

I had trouble hearing the radio, except for the recorded weather ... that was okay, we played it twice. We did not catch the altimeter setting the first time so we played it over.. But, I couldn't hear the instructions from the tower ... they were all garbled to me.

Andrea found that the use of head sets was very helpful.

I question why any flying club would instruct without the use of headsets and an intercom system between the pilot and instructor. The improved quality of reception is one great advantage of headsets but of course the protection from hearing loss is an equally important feature. Andrea spoke on this issue:

It's much easier to use the headset. The last time I went out to do circuits, David and I used headsets and I did all the radio work. It was perfect. I didn't have to go "What?" everytime he said something. I think I stayed calmer because there wasn't so much noise, so much yelling. I didn't have to guess at what the controllers were saying, which they tell you not to do. They get a little impatient with you if you ask them to repeat three times!

Henley (1984, 1985) suggested that one of the primary stress producing agents in flight training was the instructor. From this I believe it follows that the quality of the communications between the student and instructor will greatly influence the rate of learning. As Andrea said:

It's nice to have nothing to hear but the calm voice of the instructor. It's no good when he's shouting instructions at you and you're trying to hear above the engine noise and then find yourself shouting back at him. Even though you are not shouting for other purposes then to be heard, it's a stressful situation.

The quality of communication that takes place in the cockpit during flight instruction has a tremendous influence

on stress levels and skill acquisition. If the student does not receive the message clearly, the information is of little value. If the noise in the aircraft is causing fatigue, the student does not receive transmissions clearly from air traffic controllers and pilots, and there is a definite compromise in safety taking place. I believe this area is worthy of future investigation.

The sensations of sound, touch and hearing are received by the pilot almost instantaneously. Flight safety is dependent on the speed with which the pilot can interpret the many sensations, make an appropriate decision and perform the correct motor response. The importance of being able to decipher all this information and act on it is probably not obvious to the non-pilot. Similarly, as a passenger on an airline our main concern is to arrive at the airport on time to catch the flight and to hope we will arrive at the destination on time. However, for the pilot, time is experienced in an incredible variety of complex forms. The pilot's experience of time will be discussed in the following chapter.

CHAPTER VIII

THE PILOT'S EXPERIENCE OF TIME

Since time has no proven existence apart from the sequence of events all God has to do to change or end time is to change or end the sequence of events. And that is just what He seems to be doing - as it looks from here (flying). (Murchie, 1954, p. 416)

Time and the Pilot

Time You First Encountered Flying

Andrea grew up in the North and therefore planes were a part of her childhood landscape. Most children have a fascination for anything that flies, be it birds, bugs or aircraft. It is difficult for Andrea to recollect the beginnings of her desire to become a pilot. Many pilots spoke of playing with toy planes and in some cases they happened to live near an airport.

It would be interesting to know what influence parents who are pilots have on their children's attitudes towards flying. Andrea suggested that a child who flew a great deal with parents would be much more inclined to take up flying in the future. Perhaps flying for the children of pilots becomes as routine as skiing for the children of skiers.

Most pilots claim they wish they would have started sooner. The expense involved in flying is probably one of

the major factors inhibiting people from flying. Pilots who have to quit flying for medical, financial or other personal reasons find it very difficult to accept. One ex-pilot spoke of being "successfully divorced from flying." The great difficulty some people have in giving up flying suggests that it has a somewhat addictive nature to it.

Age of the Student

Changes with age in ability to learn are usually small up to sixty. Learning difficulty may be attributed to perception, motivation, set, attention, and the physiological state of the organism. Nevertheless, it is harder to teach an adult because of the complexity and maturity of the organism. (Singer, 1972, p. 148)

Andrea was in her late twenties and felt that this was the right time for her to learn to fly. Her decision to start flying at that age was based partly on financial considerations but also she "felt" she was ready for a challenge. This "readiness to fly" may be felt at various ages with various people.

MacMillan (1985) commented about the relationship between pilots' ages and flight proficiency:

If you get into things like smoothness, roughness, then I can even give you age differences because once a person starts to learn flying over sixty, I don't think you'll find too many that will ever be smooth pilots, but there are still some darn good pilots who learn (how to fly) later on. They are not smooth but they are good pilots. They'll never kill you because they are so aware.

Many instructors felt that it was easier to teach younger pilots to fly, they seemed to pick up the skills quicker.

Gwilliams (1984) commented:

Yes definitely, age is a factor. I've got two students now, one my son, and it just amazes me how the two of them caught on. They had no trouble at all. Younger, sure, they have a real advantage in learning.

Some might say that all teenagers may not be mature enough to make responsible pilots. The cadet programs which produce top quality pilots seem to disprove this notion.

Time it Takes to Learn a New Flying Skill

Without going into an elaborate description of the factors that influence skill acquisition, suffice it to say that some student pilots require more time than others to acquire skills. Andrea was aware that she would probably reach various plateaus in her flight training.

I know I am having trouble with landings but in a few hours that probably won't be such a big concern, there will be more concerns that I haven't even thought of.

Andrea felt the time it took her to learn new skills was primarily limited by weather conditions. If the weather was bad she had to cancel bookings.

This time factor would also very likely be affected by the quality of instruction, the amount of other traffic in the air at the same time, the student's intellectual capacity and perhaps the aircraft type. The student's attitude towards flying would also affect the rate of skill acquisition. Several instructors (Devine, Urie 1984) commented that aggressive students are difficult to teach.

Frequency of Lessons

Sometimes I feel like I'm forgetting something from one week to the next and I find that when I have two lessons

on two consecutive days, the second lesson is great. I just don't have the time to book a lesson three times a week. (Andrea)

Most research supports the idea that distributed practice (once every second day) is more effective than massed practice (many times a day). Andrea found that if she waited more than a week between flights she had forgotten part of the previous lesson. Normally we would expect to find a decrease in retention with the passage of time in which there is no practice. Devine (1984) agreed with the notion that distributed practice was essential:

To some extent it is an individual thing and different student pilots manage in different ways but there is only a certain amount of time you can get away with and still progress. I like to see all my students three times a week, and more if they can. Three times a week is minimum.

In a later section I will discuss the time it takes the student to complete the licence, however, at this point it is worth taking note of one other bit of advice Devine gave regarding the frequency of lessons:

I say (to the students) "do it at a time of year when you have the time and the money". If you have any lay off periods, it only costs you more so I recommend that they do it in a few months versus a year. Some people don't care about how much time it takes them to get a licence but at least I told them.

There is some suggestion (Singleton, 1978) that what happens between lessons is fully as important as what occurs during the lessons. We learn new skills while actively engaged in them, however, much learning (change) takes place as we recall and evaluate our performance afterwards.

Plateaus of Learning

There were times in Andrea's training when her skills constantly improved. At other times this learning curve flattened out a bit. Her progress was very rapid until her solo flight and then a plateau in learning appeared to take place. Most pilots made reference to these learning stages and instructors often spoke of plateaus in flight training but most of them cautioned that these plateaus occur at different times and in different segments of the flight training program. Gwilliams (1984) said:

Everybody will be different as far as their individual plateaus, but they all hit them.

Time to Solo

When is it time to solo? When your instructor says so? When you feel you are ready? The interview before her solo flight Andrea concluded she was ready to solo because, "I know how to do circuits and I've got all the radio work down." Andrea described her "time to solo" in the following way:

I got up that morning and I knew I was going to do it (solo). I don't know why, but I knew it. I went well ahead of time and had coffee with David ... It was windy - no turbulence but it was windy. We did two circuits and then he (instructor) picked up the mike and asked for a full stop. I thought "Okay, this is it." Then we taxied off, he jumped out and said, "You can go and do one by yourself. Are you ready? Yeah, you're ready."

For many students the solo flight is the time when they realize that they really enjoy flying. For a few pilots this is the flight that convinces them that flying is not for them

and they terminate their lessons at this time.

Time it Takes to Get a Licence

Andrea was not really concerned with the time it took to get her licence. As she said:

I'm confident I'll go through with it. I'm not going to push it. If there's something I don't feel comfortable doing, I'm not going to go ahead. I'm not going to try and solo before I feel comfortable with it.

People progress at varying rates in their flight training. The private pilot course could be completed in two months or two years. One indicator instructors use to evaluate student progress is the number of hours it takes to solo. There have been cases of students taking fifty or sixty hours to solo and hundreds of hours to complete a private licence. Most instructors feel that these pilots should "not be in the air."

Future Time

I see myself as flying heavier aircraft IFR. I tend to look at the instruments too much anyway and so I wouldn't mind getting an instrument rating because in the slightest bit of wind and turbulence ... I'm not comfortable in a 152. I would rather fly around in a twin.
(Andrea)

There is something about flying that compels pilots to constantly plan ahead. The private pilot talks about taking a commercial licence. The commercial pilot goes after an instrument rating. The future is always being planned and plans are always being revised. As Clarke (1984) put it:

I would still like to get that instrument rating. Pilots are always trying to achieve that "high." It is not sufficient to just be good - there is always a new goal.

The pilot's perception of future time appears to be closely linked to the whole notion of becoming. Jacknicke (1984) elaborated on this point:

Becoming can be this kind of becoming (circular motion) ... it's transcending. Becoming in the phenomenological sense isn't linear. You never get there. That sense of becoming is infinite. You are more than what you were. The whole notion of becoming is a world of possibility.

Shortly after my conversation with Dr. Jacknicke I had the opportunity to fly across the prairies in the cockpit of a DC-9. I questioned the captain of the airliner, a veteran of many decades of flying, on this very issue. Captain Kirk suggested that when one had flown enough that each flight was predictable and no new sensations were experienced "becoming a pilot" had been accomplished. What he was saying was that pilots are always in a "state of becoming", and that if they ever do "become a pilot" they should quit flying.

Assuredly clock time as known to children and geographers is an elementary, finite truth, but that can hardly be all that the human mind and spirit are capable of. Time already seems to me more realistically an explosion of the finite into the infinite. I cannot any longer even think that time actually begins and ends. (Murchie, 1954, p. 416)

Time to Die

No one knows when it is their time to go so my experience has been that you don't plan too much ahead. (Andrea)

A significant number of pilots and passengers, whom Andrea was acquainted with, were killed during the course of her training. Three to four dozen aircraft accidents occur in Canada each month. Crashes are part of the pilot's world.

Although pilots like to think and are often heard saying, "It is safer to fly than drive.", accident statistics that compare flying to driving do not support this contention. Keeping in mind that vehicles have varying speeds, seating capacities, missions and frequencies of usage, the National Safety Council (U.S.A.) compared the rates of deaths per 100 million passenger - miles:

Deaths per 100 Million Passenger Miles

Airlines	0.01
Buses	0.13
Autos	1.30
General aviation .	16.00
Motorcycles	20.00

(Aviation Safety, 1985, V 7, p. 16)

These figures are an "average" accident rate - a pilot can be much safer than average if he maintains high standards.

Thus far we have Andrea's fatalistic view and the Safety Council's rather grim statistics. A pilot who crashed and came very close to being killed, gave me the following opinion from a hospital bed (six months after the crash):

Some people believe that when your number is up, it's up. Why am I still here? Well, I wasn't ready to go. I think there are things in your life that you can do to make it safer. One of them is to keep your feet on the ground, but then some of us just got to fly.

The Course of Time

Day and Night

I usually like to go flying first thing in the morning ... for ... two reasons; hardly anybody else up at six o'clock to go flying plus the winds are always calmer.
(Andrea)

All of Andrea's student pilot instruction took place during daylight hours. Whenever her enthusiasm started to wane, I would take her for a fly in the early morning when the air was free of turbulence. The time of day has a great influence on the quality of the flying experience.

Time of Year

They were laughing at me Friday morning because there was a wee bit of frost on the aircraft. The guy from the hangar came out and said "Well, I'll do your leading edges." I said, "You can laugh if you want but I don't really know how much is too much." (Andrea)

Winter is probably the most difficult time of the year to fly in Canada. The aircraft can accumulate ice and snow and the daylight hours are short. The short days in winter made it difficult for Andrea to fly other than on weekends. If the weekends were stormy, she might go several weeks without a lesson.

Summer time brings longer days and a much more picturesque landscape. The contrast in the landscape makes navigation by ground reference much easier. Andrea preferred flying during the summer season.

Waiting on Weather

Pilots spend a great deal of time waiting for the weather to clear. Modern technology has allowed us to describe weather conditions in great detail and to forecast (with a lesser degree of accuracy) however, we are yet unable to control weather.

The only comment we can make about weather with any degree of certainty is that we know that it will change. The best observation of weather systems I received was offered by a seasoned bush pilot (Weber, 1976) as we sat peering up at the two hundred foot cloud ceiling:

They claim it's gonna clear - it always did before!

Logging Time

Time is logged in flying for a variety of reasons. Air time is logged in the airplane journey log book as a means of documenting hours flown for the purpose of ongoing maintenance. The journey log also forces the pilot to verify that he/she is flying within legal limits.

Andrea's pilot log book was a diary of her flights and an account of the events that occurred on those flights. Dual hours (instructor on board) and solo or pilots-in-command hours are logged. Andrea was very pleased when she was finally able to log some pilot-in-command hours:

See all this dual stuff - and then - solo. The solo goes in red (ink). I now have 1.1 hours solo. I've got 17.3 hours so I should end up soloing before 20 hours.

Pilots tend to be categorized by the number of hours they have flown and are generally grouped into the low time or high time categories. MacMillan (1985) saw some relationship between the number of hours a pilot had logged and accident rates:

Pilots up to about 100 hours have a fair number of accidents, then they clean right up until they get to about 500 hours. They have learned a lot and are being very careful. Between 500 and 1000 hours, it is not uncommon to become overconfident and they start having accidents again. Somewhere around 2000 to 2500 hours, they become very afraid. The accidents do not necessarily increase but a lot of people stop flying.

As Bach (1983) suggested, the best geographers and historians are those who have seen the world and its history in their own eyes, from a private airplane. The early explorers documented their travels in daily journals and modern day pilots record their adventures in log books.

Time in Motion

The Take Off Roll

Neil: If you were in your take off roll and it was refusing to fly, at what point would you say "This is long enough." or "I've gone far enough, I don't want to proceed?"

Andrea: Well, in a 152, the plane should be in the air before it comes in line with the terminal building (half way down the runway).

The take off roll is the transition stage between being tied to the ground and finding freedom in the air. The roll is little more than driving the aircraft down the runway keeping straight with brake and rudder and letting it fly itself off when it is ready.

Time Flies By

I looked at the clock once and I thought it must be 2:00 o'clock but David said, "no it's 3:00." I couldn't believe it, time just flew by. (Andrea)

Indeed, when one is in an aircraft time must fly by.

Unlike automobiles, aircraft rely on a very precise time-space

continuum. Murchie (1954) explains:

The sky is more primitive, elemental, and somehow fiercer than the earth below. In the sky you cannot stop: to stop is to die. (p. 94)

Bauer (1980) also suggested that when we are flying the rest of the world goes away. "We suddenly have no past or future. Our lives have been erased from our minds. We have only our flight." Bauer's suggestion was that the mind is empty of everything but the immediate moment of experience. When flying an aircraft we must concentrate on the present. The pilot can experience a different sense of time because he/she can move into a different reality.

Saint-Exupery (1939) gave the following description of his experience of time while flying:

The towns slipped past as in a dream. I was going so far - or thought I was going so far - that these wretched little distances were covered before I was aware of it. The minutes were flying. There are times when, after a quarter-hour of flight, you look at your watch and find that five minutes have gone by; other days when the hands turn a quarter of an hour in the wink of an eye. This day time was flying. (p. 177)

One of the factors that seems to influence the "flight of time" is the ground speed. Speed of course is directly linked to time and distance. The aircraft may be indicating a speed of one hundred and fifty miles per hour on the airspeed indicator, however, if it is bucking a fifty mile per hour headwind, the ground speed is only one hundred miles per hour. Many beginning pilots forget that it is the ground speed and not the airspeed that determines how much time will

be spent in the air. Time does not fly when the pilot is encountering a strong headwind.

Time Limit - Fuel Supply

When a car runs out of gasoline, the driver may be inconvenienced by having to walk to a service station. When an aircraft runs out of gas, the airplane become a glider. An unfortunate pilot described one of these experiences:

There I was not paying proper attention and just south-east of Saskatoon I realized I was really low on gas. I got on the radio and asked if they had an alternate airport for me. I was heading for it and could see the airport then ... the old prop started windmilling. I got back on the radio and I said I had picked an alternate and I will call you from the ground. I heard them (controllers) yelling "Do you want to declare an emergency?" "Negative on the emergency, negative, I've just found another spot." I didn't want them to know that I was out of gas. I just glided down and landed on a farmer's driveway. It was pretty tight but I got in. I rolled up right in front of his house. They were super, had me in for lunch and for an hour and a half his wife is telling me why I shouldn't be flying.

Of course not all cases of fuel exhaustion end with such a happy ending. Andrea went on a flight with a friend where the fuel supply was not very carefully calculated:

When we landed there was nothing showing on the fuel gauges, we were into the reserve.

One of the most important facts the pilot must learn is that the fuel supply is finite. When the fuel is exhausted, the flight is over. Fuel burn is related to engine R.P.M. and time. Fuel burn is related to clock time not the pilot's experience of lived time. Smart pilots are careful to record their take off times carefully and to depart with full fuel

tanks.

Time to Think in Advance

At the beginning of her flight training Andrea had one concern that seemed to haunt her every lesson: "I hope I will be able to think fast enough." It often happens that when we are engaged in learning any new skill that has a time factor involved, the performance tends to break down when we are put under pressure. The problem is one of sorting out which movement or procedure is appropriate at any given moment. Time is moving too quickly for the unskilled pilot.

In tennis we are able to move through the movements of the forehand drive in slow motion. We can concentrate on the stance, the grip, the backswing, the point of contact and so on. When Andrea was learning to land the aircraft, the skill could not be slowed down. The aircraft was approaching at a fixed speed of eighty miles per hour. Andrea's suspicion that she might not have enough time to think in advance was verified as her training progressed:

I have too many things to think about at one time ...
I let the airplane get ahead of me and pretty soon I'm
in a panic to get it landed because I have too many
things to do at once.

In time Andrea was able to predict the comments the air traffic controllers were going to make. She became more familiar with the performance of the aircraft under various wind conditions and was able to enter and depart the circuit without difficulty. In addition she was more aware of the

situations that caused problems in the past and would plan specifically to avoid confusion while in the air. She explains:

In no time at all I had to make my turn to 270 (degrees) and I didn't know what I was going to do first for a second, you know, level off at 4000, call advisory? I had learned I can save a lot of hassle by taking the time to sit down, and plan the whole thing properly before I take off.

Time to Prepare to Land

Neil: Of the different legs of the circuit, what's the most stressful?

Andrea: The base leg.

Neil: Why?

Andrea: Well, you're cruising along at 3200 feet and you just called the tower and you tell them you're on downwind and they acknowledge. All of a sudden you've got to make that final turn and you've got to keep your nose up until the air speed drops. You have to do your pre-landing checks. Then you have to start looking for how you're going to land. I'm always in a rush.

Andrea found that preparing to land was difficult because she just didn't seem to have time to do everything. Part of the difficulty stemmed from the fact that she was reading her pre-landing checklist and trying to fly at the same time.

I'm hoping to memorize the pre-landing checklist and so that way I won't be looking down at the sheet and trying to keep everything steady at the same time, that I am trying to concentrate on flying. (Andrea)

Time to Flare

Neil: What's the hardest part about landing?

Andrea: Flaring; knowing when to flare and how much. If you do it too soon, it's (aircraft's) going

to go back up, and if you do it too late obviously you're going to end up with your nose on the ground.

Knowing when to apply back pressure on the column to allow the main gear to settle before the nose gear was a challenge for Andrea. The flare can only be accomplished successfully when the airspeed and height of the aircraft above the runway are coordinated.

Probably the "smoothness" that was associated with competent pilots earlier is a quality that assists in this transformation from the glide, to leveling off, to flaring and finally the touchdown. Skilled pilots do not appear to rush the aircraft. The aircraft lands when it is ready to land, when it no longer has the energy to fly. Devine (1984) put it, "When you were flying, didn't you just know when the timing was right and you go ahhhh!" What we must always remember is that a great deal of learning precedes this stage.

The pilot's experience of clock time and the inner sense of time are important. Although pilots are dealing with the here and now when they fly, they are, however, always planning for the future. The future can only be enjoyed if pilots exercise a cautious use of the freedom that flying can offer. The pursuit of freedom will be explored in the following chapter.

CHAPTER IX

THE PURSUIT OF FREEDOM

Individual Volition

Once the plane has left the runway the pilot must take responsibility for returning the craft safely to the ground. Since over eighty percent of all aviation accidents are the result of human error, the safety of any flight will be closely linked to how well the pilots understand themselves, and have internal support for themselves. Pilots are being faced with decisions and choices. Indeed, the pilot will ultimately make the choice between control and panic; life and death. The following section will approach and describe some of the judgments Andrea had to make as she came to a better understanding of self.

Am I Responsible?

People must learn they are ultimately responsible to put their foot down. "No, I can't do it!" "Yeah, the guy next door can do it, but I can't do it!"
(MacMillan, 1985)

The point that MacMillan was making was that pilots must take full responsibility for the safety of their flights. Pressure from passengers or concern that turning back in poor weather will look foolish to other pilots, must be ignored.

Common sense flying is what keeps pilots alive.

Andrea learned very early on that the decisions that must be made in flying are ultimately left in the hands of the pilots:

If they cleared me to land and I saw another aircraft on the runway, I would decline the landing. It's my responsibility. It's always the pilot's responsibility to make the final decision even if the controller clears you to land.

As a student pilot Andrea realized that she was only considered responsible (and skilled) enough to fly by herself (student pilots cannot take passengers). She was allowed to risk her own life but not the lives of others. As she said, "I can kill myself, but not you."

The many accidents that occurred during Andrea's flight training reinforced in her that the idea that "it couldn't happen to me" is a dangerous one. A pilot I spoke to, who had survived a serious crash, supported this contention:

That is a dangerous thought pattern, because you are going to get caught on it, but, I think you hope it doesn't happen to you. Anyone with common sense knows it could happen to anyone. I don't think you will criticize another person's accident unless the scenario is such that from the ground up he is doing dumb things.

Being responsible as a pilot seems to be directly linked with having common sense. If common sense is comparable to displaying good judgment, there are some researchers that feel judgment can be taught. Devine (1984) elaborated:

If they walk in that door and happen to be half way common sense type people, they don't have to be a

brain, they can be taught these things (judgment training). They have to be open minded enough to receive them. There are a lot of people who walk in there and they know it all. That is a harder guy to change.

Do I Know My Limitations?

Andrea's instructor made the following comments:

You have to fly by the rules but I think each pilot should have his own rules, his own limits. If he sticks with them, as far as the safety aspect goes, he should be safe. If he starts going beyond these limits because he feels he has to get home, then the problems begin.

Andrea was very carefully presented with the legal flying limits. She knew what atmospheric conditions allowed flight and what conditions forbade flight. The difficulty arises when pilots have to judge their own flying skill on those first cross country flights after they get their licence. Engel pointed out that good flight training should make pilots aware of their limitations:

This is part of the progression through a ground school coupled with flying at the same time ... you do learn these limitations and you learn to respect red lines or engine operation and so on but that's part of being an intelligent pilot.

As Andrea arrived at the flying club for her first solo flight from City Airport to Training Airport a light drizzle started to fall. She questioned flying in the rain even though the overall visibility was fine. A few of the pilots standing around the club joked about her hesitation:

I wasn't very pleased with the comments. I sat down, had a cup of coffee and sort of collected myself a bit.
(Andrea)

The point is Andrea was not comfortable flying in the rain. She was questioning her ability to cope with another element.

Ribout (1984) felt that student pilots should be pushed to their limits. He felt that if we didn't experience the outside limits of our flying abilities we would not know how to react in emergency situations. Gwilliams (1984) felt that there are different ways to overcome the "know it all" attitude in student pilots:

One way is to show them they just can't do it all. Give them something that is impossible for them to do. Now he doesn't know it. This puts you back on even terms again.

Aircraft and pilots have limitations. Flying is largely a process of making the correct decision at the correct time. The student pilots who embark on a flight training with the attitude that they are almost invulnerable are a hazard in the sky. Andrea was very aware she had personal strengths and weaknesses. She approached flying with respect for a sport that can kill. When I asked her before her first flight how she thought she would feel when she got behind the controls for the first time she responded thusly:

Cautious - I'll be excited and I'll be cautious too. I won't say I'll be scared, but I'll definitely be ready to listen to the instructor - for sure.

Am I Critical Enough of My Flying Skills?

I am very critical of myself. I expect top performance all the time. Anything less is very disappointing. I have learnt to control some areas but I still feel that way about flying. (Andrea)

Andrea had very high expectations and from the outset of her flight training she engaged in constant self evaluation. This kind of dialogue with self seemed to be the means she used to plot her own progress. She was constantly monitoring and assessing her performance:

I noticed that during the last flight my movements were getting coordinated a lot more and it seemed that everything went a lot smoother. I could look at a gauge and say, "Oh yeah, well, I have to do this now."

One of the most difficult skills for Andrea to master was the landing. It is not unusual for student pilots to bounce the aircraft when learning to land. Andrea found it difficult to cope with these initial "bumps" and "grinds" as she worked out her landing procedure:

I'm trying to do it perfectly. He (instructor) said, "don't worry if you bounce, don't worry if you don't land it right, don't worry about doing it perfectly." He said, "Just worry about getting it down." I think I'm ahead of myself, I'm trying to do it perfectly and then I don't have enough experience to correct it if something goes wrong. I panic and tense up as soon as I'm ready to land.

As the student pilot gains experience, there are fewer novel situations encountered in each flight. In time Andrea could predict the factors that would cause stress and uncertainty and although she admitted to being afraid from time to time, she never lost control:

Today there was a couple of times I loused up. David asked me how I did and I said, "Well I made some mistakes but fortunately I caught myself and I fixed them." He said, "Well, that's all that counts, as long as you catch yourself, that means you're thinking."

Most pilots are always striving to improve and tend to be critical of their own skills. As Andrea said, "You can't leave anything to chance." The pilots who take chances or who fail to acknowledge the importance of ongoing professional development, often end up as accident statistics.

Am I Fit to Fly?

I sometimes feel a checklist should be developed for pilots to enable them to determine if they are airworthy. If the majority of accidents occur because of pilot error, perhaps this would be a reasonable precaution for pilots to take. In the past couple of years there has been increasing concern about the human factors involved in aircraft accidents. Bad marriages, financial difficulties, drinking problems and many other factors will have an effect on the safety of any pilot.

Andrea was aware that her changes in mood affected her flying. On one occasion she confused two runways and started making an approach to the wrong runway. She gave the following explanation:

It had been a long few days of work and I didn't really realize how tired I was until after I got up there ... I knew I was tired and I think I got lax. I wasn't thinking fast enough. What I should have done was reviewed the runways before I went because it had been a while since I was up there.

Pilots must be focusing on the "business at hand" when they are landing. On one occasion Andrea decided it was time for her to land because she could no longer concentrate on

her flying:

I was starting to feel uncomfortable. I was getting tired and I was thinking about a break. I was thinking of all the coffee I drank and what-not.

Only the pilots can decide if they are fit to fly. Passengers can only hope they are able to make an accurate assessment.

Am I Ready to Solo?

He asked me if I was ready and I said, "Well, yes." He said, "Yes, you're ready - go ahead, have fun - don't rush." and he radioed the tower and told them it was my first solo. I went out and did my run up and I think I was nervous taking off. (Andrea)

The instructor has the major responsibility in determining if his student is ready to solo. No doubt this was a very critical time in Andrea's flight training. As David said, "I just wanted you to prove to yourself that you could do it." Because we are always becoming more proficient in our flying skills, there are many situations we encounter where we feel we are not quite ready for the task at hand.

Should I Quit?

At various stages in her flight training Andrea considered quitting. She would make statements like:

I was really discouraged today, I'm not to the point where I could hang it up, I wouldn't do something that drastic but I was really upset.

As we neared the end of the study Andrea mentioned to me that it was encouraging for her to have someone (me) to talk to as she went through her training:

It's really been a lot of fun being able to brag about my every encounter with somebody who understands. Did you realize that I just about quit there for a while ... I don't know if you know that?

Andrea claimed that a combination of difficulty with several segments of the flight training and lack of support from her colleagues at work made her consider quitting.

I got all that navigation stuff thrust on me and the hassles I was getting at work made me have serious thoughts about whether I was to continue or not.

Other student pilots attributed the idea of quitting (or almost quitting) to poor instruction.

I almost quit when my instructor took me out and assumed he already told me what a stall and a full spin were. He hadn't and he just did it. I hung on to the ceiling of the airplane and the seat and I didn't let go until we landed.

One student pilot quit because he had twenty-six hours and had never soloed. He said out of the twenty-six he might have had six hours flying the airplane. The instructors flew it the rest of the time. It's no wonder he didn't solo in the twenty-six hours.

Gwilliams (1984) suggested that a significant number of students quit just after or just before they've soloed. He gave the following explanation:

They're either afraid to solo or once they've gone up by themselves they don't like it by themselves, so they quit. They say "I got away with it once, flying is great with someone else and I don't have to worry about all those emergencies or if something happens what am I going to do." Once they go up there by themselves they sometimes just don't like it.

It is not uncommon for high time pilots to quit flying. It may be that they develop some notion that they "got away with it" this long and that their number could come up. Mac-Millan added another explanation:

It's part of the learning process. I think you reach a stage where you realize that you have been flying for so long not knowing anything. In retrospect it scares the hell out of you. (1985)

When Do You Become a Pilot?

When does she become a pilot? Now I'm sure we could say she is a pilot when she does her first solo or she's a pilot when she gets her licence, but when does she become a pilot. I'm sure a point in time will come when she says "Yea, I know what it is like to fly." When is that point? Try to capture that and then I think you are at the essence of flying. (Jacknicke, 1984)

The suggestion Jacknicke is making is that the individual will decide when they have "become a pilot." Becoming a pilot was therefore perceived as more of a state of mind than a point in one's flying instruction when certain skills had been acquired. I pursued this notion further and Andrea came up with the following response when posed with the question, "When did you feel you had actually become a pilot?":

It wasn't that I woke up one morning and said "Hey, I'm a pilot.", but you know I did my first solo in June and I wrote it in red (in the log book). It wasn't right after that that I felt that but ... It was about a month later ... on the 15th of July ... I went out to (Training Airport) by myself and stayed out there for 1.9 (hours) and it was then that I felt more like a pilot. After my first solo I went two times with the instructor before I went by myself ... and the time I went by myself ... that's when I really felt that I was in control. Becoming a pilot is feeling that you are in control.

Further on in our discussions Andrea's comments on the notion of "becoming" aligned with the interpretation Jacknicke (1984) had presented: the sense of becoming as "infinite", a "world of possibilities."

Becoming has that connotation of striving for excellence and I know there isn't anybody on this earth who can approach excellence as far as aviation is concerned. Maybe some of the astronauts come close. (Andrea)

Becoming a pilot does not necessarily require flight, at least not in the literal sense. I believe that "becoming" is synonymous with learning. As long as pilots maintain an active interest in flying and are keen to acquire new knowledge regardless of how formally or informally it is presented to them, they are "becoming pilots."

Do I Wish to Share this Experience?

Throughout the study I acquired the sense that many pilots have stronger than average drives to accomplish difficult tasks and are independent by nature. Navello and Youssef (1974) found that pilots have personality profiles that differ significantly from those of the general population. They found that pilots show a stronger desire to do new things, to talk about personal adventures, to argue for their own points of view, and to be interested in the opposite sex. Most pilots are very pleased to share the experience of flight but at the same time consider flying to be a privately rewarding event also. Cooper (1984) commented on this point:

A lot of the pilots I've met like to be on their own. They are quite happy on their own. They don't need other people to make them happy all the time. I think flying gives them a lot of peace of mind.

Andrea often spoke of enjoying the experience of "getting away from it all" in the airplane:

It was great going out there early Sunday morning because no one else was around.

She also participated in a variety of individual sports and led a very independent lifestyle.

Another pilot gave the following explanation of why she pursued flying as a career:

Nobody else cared, it was just something I did as a personal achievement. I had done something that I had never in my life done. I never really finished high-school. I was a semi-dropout because I hated it. I didn't think I was learning anything there. Flying was the first time I had completed anything.

Many other pilots perceived flying as a challenge, something they had considered doing for many years. It is interesting to note that another opinion relatively commonly shared was that many pilots are insecure and are "begging for pats on the back." (MacMillan, 1985)

Almost all the instructors surveyed stated that there does not appear to be enough common characteristics among student pilots to generalize about personality traits common to pilots. (Winther, 1984)

Is this Work or Play?

At the beginning of her flight training Andrea perceived flying to be much more work than play. As she progressed through her training and became more confident with her skills, flying became more of a form of recreation.

An instructor gave me the following explanation of how

he perceived the work and play issue in flying:

Look at my situation today ... I could have said, "No, I'm not coming in today." This was my day off. I thought, "Why not come in and do a bit of flying." All of a sudden I have four bookings and then five. Some people would say, "You didn't have a day off.", but I really feel like work is a holiday most of the time. I enjoy it so much it's not work. (Gwilliams, 1984)

There is no doubt that some flying is far more stressful than others. It may be that the bush pilot hauling boxes of fish perceives his flying as being more like work than the business jet pilot hauling executives.

Influence of Others

Friends and Colleagues

Andrea found that rather than being neutral her friends and work colleagues either supported or opposed her interest in flying. She felt that many of those who showed opposition were concerned about the safety and that their opinions were based on a lack of information:

I think it (their opposition) is because they don't understand a lot of things about flying. They don't understand that if the engine stops you don't go straight down and crash. They think aircraft are little noisy things like vacuum cleaners. (Andrea)

The clear split in the opinion of Andrea's friends is very evident in the following statement:

Some people say that I must have a lot of guts and some people say that I must be totally insane. I have had both varieties of reactions from people. Generally speaking, to the people that count, they think my flying is great.

Andrea attributed the negative comments to two factors:

sexual stereotyping and a warped public image of what flying was all about. She commented thusly on the first factor:

These girls who are saying it (negative remarks) are scared to downhill ski or ride on the back of a motorcycle. They think I am nuts to lift weights. They are very traditional types of girls and they don't ever see themselves flying airplanes. They cook and sew and do all the traditional female types of things.

The second factor dealt with the public image of flying and more particularly the risk factor in flying. It is interesting to note that in an average year over one hundred thousand people are killed in the world in household accidents whereas only two thousand are killed in aircraft accidents and the public persists in seeing flying as dangerous. (Howard, 1984) Andrea and I discussed this warped public perception:

I think some people think we (pilots) would just go out and fly into a storm or fly under bridges and things like that. They think people who fly aircraft get their kicks by doing snap rolls and spirals. They think I should be scared to fly. I think if you took any activity in the world there would be at least one person who found it scary. (Andrea)

When an aircraft crash occurs, the media generally gives it a high profile in its news coverage. If an aircraft runs out of fuel and lands in a farmer's field, the event will generally be reported in the press. How many cars run out of fuel without any public attention? As the severity of the incident increases, the media coverage also increases. Andrea received a great deal of negative feedback from her colleagues at work because numerous crashes had occurred during

the course of her training:

I just about quit. Everytime I said something about flying at work all they would talk about was the crashes. It really disturbed me that they thought I was so incompetent that there was no way that I could learn how to fly an aircraft. I just heard so many people telling me I was nuts.

Family

The influence of the family can be felt in numerous ways by the student pilot. Andrea felt the first family influence would be in childhood years.

If your father was a pilot you would probably be flying when you were tall enough to reach the controls. Your father probably would not laugh at you if you didn't do something right. It is really important to have the encouragement of your parents.

From my own experience I can see the influence my interest in flying is having on my daughter. She has flown with me since birth and is very comfortable in the aircraft today. She has some sense of the controls and at two takes great delight in pitching and rolling the aircraft. It is not uncommon for her to make two or three requests daily to "fly airplane daddy." As Andrea put it:

I am quite sure that a lot of people do follow in their parents' footsteps as far as careers and hobbies go. They have a headstart on everybody else because they know the terminology and they have an idea of what flying is all about.

Andrea felt the decision for her to take flying lessons was a relatively simple one to make. She was single and had no dependents to be concerned about. Several of her friends questioned her decision because of the expense involved:

She said to me, "Isn't that awfully expensive taking flying lessons?" I said, "No, I don't have any kids to put shoes on or to take to the dentist."

Flying has an addictive nature to it. Pilots love flying. Problems can arise when the spouses of pilots do not share their enthusiasm for the sport. I questioned Andrea on this point:

Neil: What if you get married and your husband couldn't stand flying and didn't like you flying?

Andrea: I wouldn't marry him without getting that straightened out first. I wouldn't expect my husband to be my boss. There would be a lot of discussion about something like that before marriage.

Andrea admitted that many of the women she spoke to might not share her opinion and that many of them "gave up a lot to get married and have kids." She added that "traditionally women always seem to give up something for the guy they love." I think the point to be made here is that it is easy to say to a future spouse, "I must warn you, I am a fanatic about flying.", but non-pilots do not understand what addiction to flying really is. A commercial pilot confided:

I don't know if I could really get involved with anybody too seriously who at least didn't like flying or wouldn't go up.

Many instructors spoke of students who quit flying because their spouses did not approve of the financial outlay flying required or because they were afraid their partner might be killed in a crash. Andrea's two closest relatives, her mother and sister, "thought it was great."

Other Pilots

The most important "other pilot" in Andrea's training experience was her instructor. Her perceptions of the in-

structor were discussed in an earlier section. Probably the pilots that gave Andrea the most concern were those she encountered at the flying club or those she shared space with during flight. In flying either we feel the presence of other pilots, as in circuits or we feel very much alone, as in cross country flights. Andrea commented on this after her first flight:

We checked around to see where we were going and there wasn't anybody else up flying, we were pretty well by ourselves up there. We joked that no one else knew that we were up there.

I did one circuit and there were people waiting on the ground to take off and people waiting to land.

(Andrea)

One of the characteristics that Andrea identified in many of the pilots she encountered was the tendency to exaggerate. This may be the flying world's equivalent to "fish stories." Many of the beginning pilots (all male) presented somewhat of a macho image. Andrea comments:

Some guys rave about doing stall and spins, personally I find them sickening ... literally ... even power on turns turn my stomach. I'm not into all that. I don't find it thrilling at all. I'm not the same kind of pilot as those guys. Some pilots maybe have got so much experience and hours that they would never ever think of flying VFR. Maybe they would say ... "Oh, VFR is a joke."

There is a great spirit of comradery between pilots. If a pilot is lost in a storm, hundreds will volunteer to search. This whole notion of sympathetic affections will be discussed in a later section.

Fighter Pilots

I include a brief section on fighter pilots, not because Andrea spoke often about this area but because many instructors have suggested that flight training should be more vigorous. Engel (1984) spoke of the rigors of military flight training:

Each week ~~they~~ started a new class so we would have about fifty people ... descend on the barracks in Pensacola ... By the end of the basic training which was probably about three months, that class may be down to twenty-five people ... Psychologically there was a lot of pressure, as well as physically. There was tremendous weeding out process that they applied. The pressure was just kept on twenty-four hours a day.

Ribout (1984) felt that the military model should be applied to civilian training.

In contrast to the high pressure situation one encounters in military flight training, the civilian private pilot is catered to in a country club atmosphere. Instructors are careful not to give excessive negative feedback as this could result in a student quitting. One somewhat chauvinistic instructor stated that you must "treat 'em all like a bunch of pretty girls cause that's your paycheque walking out the door."

Air Traffic Control

Neil: If you and I were up flying and I had a heart attack - what do you think you would do?

Andrea: I think I would get on the emergency radio and channel first and explain to ATC that I don't know what I am doing. I think I would get them to help me out.

This was Andrea's reaction to a question posed during the first hours of her flight instruction. The relationship between pilots and air traffic controllers is quite unique to flying. The controller is the pilot's link to earth. Engel (1984) was in the unique situation of having been employed as both a pilot and a controller. He comments:

We didn't feel that those controllers had any control over our lives but as an air traffic controller I know just how much control over their lives I had. So you have an interdependence that isn't recognized by either party. If I were "running the world" you wouldn't get to be an air traffic controller unless you were an accomplished pilot.

At times Andrea was annoyed with the controllers and felt that they gave incorrect information. The pilot is always at fault if an accident occurs so it is important for students to be active listeners and not be afraid to question controllers.

Money

Flying is an expensive hobby. Dual instruction costs eighty dollars an hour and a private pilot's licence can easily cost three thousand five hundred dollars. Many pilots wished they could have started flying sooner but never had the funds for lessons. As Andrea said:

I have always wanted to do it but getting through University and all the studying never left me enough time or money for that sort of thing.

Cooper (1984) gave a description of her start in aviation:

I got my pilot's licence when I was nineteen. I was working and going to school so I had to work pretty hard to pay for it... because twenty five hundred dollars in those days was a lot ... plus pay rent and food ... so I ended up working at the flying club where I was taking my lessons.

When I asked Devine (1984) if there was a unique lifestyle that came with flying, she said:

Yes ... bankruptcy.

Fear

In flight training, excess fear will obviously limit the student's performance. Low amounts of fear tend to enhance performance. With excess fear or too much stress, a student will usually experience a blocking and will learn at a much slower rate. (Smode, 1966)

Grandchamp (1971) completed one of the few research projects relating to student pilots' attitudes toward fear concepts in flight training. Over twenty different fears were identified in Grandchamp's study. They could be summarized into the following categories:

- Fear of being evaluated or tested
- Fear of adverse weather
- Fear of injury
- Fear of the unknown (unpredictable consequences)
- Fear of failure (an inability to properly fly an airplane)
- Fear of the instructor
- Fear of mechanical failure.

The attitudes towards fear of weather and fear of the unknown did not change throughout the course of the study implying that these fears were not altered as a result of learning to fly. Fear of the instructor showed the greatest drop over

the test period, followed by decreased fear of mechanical failure and fear of failure.

Andrea showed a fear of forgetting procedures and instructions. On several occasions she got her runways confused and later admitted that "I was uptight because of what happened in the circuit today. I got a funny feeling in the pit of my stomach." Andrea felt that "getting into situations beyond one's flying ability" was the basis for fear. Several times she flew with pilots she did not feel comfortable with. This mistrust of their flying brought out a certain amount of fear. She describes one such incident:

When we flew back from Grande City I was sitting in the front seat and that's when I started to notice a lot of things. He just seemed to be nervous, jittery, he didn't seem to be confident about what he was doing. He wasn't comfortable sitting there.

Bauer (1980) claims that one method used to foresee problems and deal with the fears associated with them is the "worst case" technique. (p. 148) The most disastrous circumstances imaginable are postulated, and ways to respond to them are devised. He claimed it was the fear of the unknown that really frightened us. A "worst case" for a pilot is probably an engine failure shortly after take off. Bauer describes an incident:

When the engine stopped, I went through the responses - unconsciously, automatically. The potential disaster became a drill, a chance to carry out to its ultimate conclusion an often practiced exercise. The airplane was destroyed. My student and I climbed out, examined the wreckage, and watched with bemusement as the ambulances and fire engines raced to save us.

(p. 148)

Using the "fear of crashing" scenario I questioned Andrea on what she would do if she had an engine failure on take off. Her response was:

If I was only 100 feet up, I would definitely do a 180 and get right back over the runway.

When I questioned the fact that she might not have enough time or altitude to make a 180 degree turn she persisted:

I would have to have time. I would have to have space. Either that or I'd land on railway tracks - which is not good. I'd have to turn around and try and get some altitude.

At this point I stated very emphatically:

Don't do a 180 turn at a hundred feet because you'll never get around. Just go straight in because if you stall and spin in your turn, the game is over. If you fly it under control, wings level to the ground, you have a good chance of walking away.

Andrea admitted that she was afraid at various stages in her flight training. Her cross country flight for example had her very concerned:

It just seemed like going to three different airports and back to my destination by myself was a very scary proposition. I was scared of all sorts of things ... just terrified of being there by myself.

Engel (1984) felt that a healthy sense of fear was important in pilots. He recalled an incident from his instruction days in the U.S. Navy:

One student I washed out ... showed absolutely no fear. I didn't want that guy flying wing on me some day. I considered him dangerous.

Risk

Well I think a person who would make a good pilot would be the type of person who wouldn't panic in a situation,

who would be able to think rapidly to get themselves out of potentially dangerous situations. A person who is not careless or who is not a risk taker. They don't have to be overly cautious but they have to know their limitations and not go beyond. They don't take risks. (Andrea)

There appears to be a paradox here in that the best pilots are not risk takers, however, part of the attractiveness of flying is the element of risk. Risk taking is not limited to flying. Most sports have some element of risk and indeed jumping off a step is a risky event for a two-year old.

Risk is a very personal perception. What one person perceives as high risk, another person views as ordinary. Prior experience would greatly influence our perceptions of the hazards associated with various situations. MacMillan (1985) gave an example:

Yes, I guess there is (something attractive about fear) but only to some people - there are people who just will not get in an airplane. I think the same element that triggers off an absolute fear in some people triggers off a love or a need to explore in others. (1985)

Most pilots agreed that there was an element of risk in flying. They felt that the risk could be minimized by knowing the aircraft and knowing themselves. Common sense dictates that if a pilot is not able to concentrate because of concern over outside factors, the risk in flying increases.

Engel (1984) elaborated:

Sure, there is an element of risk and the pilot who does not have the nagging sick child, the mortgage payment, am I going to get the car fixed, in the back of his head is going to be able to take those risks, is going to feel more comfortable about stepping outside envelope. Somewhere down the line if you have outside problems, that could definitely interfere with

your judgment. The more high performance piece of equipment you are operating, the more that is likely to happen.

Accident statistics clearly show that it is the pilots that make flying safe or risky. The mechanical operation of the aircraft is simple compared to the complexity of the human mind. The aircraft does not fly itself into a storm, the pilot does. Several instructors agonized over the fact that although some pilots are obviously dangerous risk takers, there was little one could do about it. Devine (1984) elaborated:

I've got this licence (instructor rating) that allows me to give someone with money the skill to operate this piece of equipment that could kill him and his family. You can't stop them from doing it. You can only cross your fingers. I think a lot of people don't deserve their licence, and I wish I could say to the people, don't fly with them, they are terrible, terrible people, I can almost see an accident happening.

Most pilots were willing to take a few risks. Pilots realized that flying was more dangerous than driving. There was some suggestion that flying brought a little excitement into what was otherwise a boring lifestyle. The problem arises when the pilot overestimates his ability and in extreme cases develops a feeling of invulnerability. Andrea flew with a pilot who had deteriorated to that state.

Over time he was talking more and more confident - now he's into the instrument training, now he's got his commercial licence - this and that, but his actual flying judgment was getting worse. He was too cocky.

Several pilots confided that they took risks during their first hundred hours of flying and in later years couldn't believe they could have been so foolish. Kushniruk (1984), an aircraft broker believed that many people purchased aircraft which were too high performance for the level of flying proficiency. As a result they "missed out on an essential phase of flight training."

The bottom line is that the risk element is relative to the proficiency of the pilot. Pilots must realize that if they don't fly on a regular basis, their skills will diminish. If they don't undergo regular flight proficiency checks by an instructor, they may never identify their own weak areas. There is a problem in aviation of pilots allowing their egos to get in the way of common sense. Flying with "safe pilots" is not dangerous.

The Crash

AIR CRASH

What happened in those moments, those short few
Seconds, that seemed to each so timeless-long,
(Eternity had touched them) when they knew -
The modish, prosperous passengers, the strong
Young unreflective pilot, crew - that here,
Fronting them, barring unescapably
Their road to life, was the all conqueror
That they together faced what none could flee? ...

Each one his own slow words, his acts delayed
(That were in truth so hurried) heard and saw,
Powerless - some other being its soul obeyed,
Some stranger published loudly his life-law ...

Each had but one companion - knew, alone,
Himself, that till this hour he had not known.

Elizabeth Daryush - The Last Man

Engine Failure

A surprisingly high percentage of the accidents that occur in general aviation can be attributed to mechanical failure. Statistics reflect a figure in excess of twenty percent. The point that must be made here is that pilots must be careful to check every component of the aircraft before they take off. The mechanical work is as good as the mechanic who completed it. Kushniruk (1984) emphasized that one of the greatest hazards in general aviation today was the questionable quality of the work being performed by mechanics. From my own experiences as an aircraft owner, I strongly support this contention.

Initially, Andrea was very concerned about what would happen to the aircraft if the engine quit. On her first lesson she raised this issue with her instructor.

I told him I was worried about what would happen if the engine quit and he said, "Oh, we will have to stop the engine," so he slowed down (reduced power) to just about nothing and he said that we would land in this field. We just flew down low over the field and then added power.

A point that should be made is that an engine failure when the engine really quits is not the same as reducing power with your instructor sitting beside you. It is difficult to simulate these kinds of experiences. We all know the body reacts in strange ways when placed in stressful situations.

I think most student pilots have so much faith in technology that they really feel the engine will never quit (or at least not when they are flying). Engel (1984) felt that

because automobile engines are so reliable today most pilots never consider the possibility of an engine failure in an aircraft. He said:

General aviation today is really an extension of the family car. So it's going to be hard to get the Sunday flier to realize that an engine failure is a real possibility. You can't just pull over to the curb if it stalls on you!

Pilots are aware there is always a chance that they will crash. The chances of surviving the crash are quite good, "99%" MacMillan (1985) claimed, if the pilot kept cool and didn't lose control of the aircraft. (Learning how to crash will be discussed in a later section.) But the fact of the matter is that there is always a chance something can go wrong in a flight. Accident statistics show that about one hundred people are killed each year in general aviation accidents in Canada and approximately twelve hundred fatalities occur each year in the U.S.A. Twenty percent of general aviation accidents end in a fatality (Howard, 1983, p. 15-17)

When the famous test pilot and retired airforce General Chuck Yeager was asked in a recent interview if he was ever afraid of dying in a crash, he gave the following response:

I was always afraid of dying. Always. It was my fear that made me learn everything I could about my airplane . . . and kept me respectful of my machine and always alert in the cockpit. Death is the great enemy and robber in my profession . . .

But you didn't let it affect you. You don't give any thought to the outcome. "'Cause if you do you end up a nervous wreck. You become a fatalist. Damned right I cared. I wanted to live to be 100. (Washington Post, 1985, p.15)

Some pilots suggested that flying allows you to tease death. You can come a little closer to experiencing what some consider to be the "ultimate experience." Personally, I like Yeager's perspective that death is the "ultimate enemy" and pilots must stay cool and alert in order to avoid death.

One statistic that is difficult to deal with is the high percentage of accidents that are caused by pilot error:

James King, chairman of the transportation safety board, noting that 89 percent of fatal general aviation accidents occurred because of pilot error--and that somehow new pilots had to be taught how to apply common sense. (Howard, 1983, p. 18)

Rationalizing the Deaths of Other Pilots

When you think about a pilot that has been killed in an aircraft accident, you must remember that he made his decisions. We can formulate our own opinions as to what happened, however, the pilot made his decision, stuck to it, it obviously did him in. It may have been a wrong decision, but at least he was the one who decided what was going to happen. Whether he chose to push bad weather, whether he chose to go the wrong direction, or whatever. The point being, that you can feel badly for him but he made the last decision. Where he is is because of something he did. (Clarke, 1984)

Clarke's comments summarized the feelings many pilots expressed about crashes. Flying was perceived as a sport where one ultimately took total responsibility for life. Another pilot who survived a serious crash made the following observations:

My biggest question is what happened. Why did that happen? Even mine (crash), I'm sure people say,

"How could that happen?" I only remember the approach but I figured it out logically how it could have happened, but I don't know for sure.

Many pilots admitted that the thought "it could have been me" crossed their minds when they read about aircraft accidents. On the other hand, some pilots mentioned that accidents serve as examples to them of what not to do.

Andrea did not experience anything more serious than turbulence during the course of her flight training. Her thoughts on crashes were therefore not based on lived experience. The closest she came to a crash was being offered a ride by a pilot who subsequently flew off and killed himself in a collision with a tower. In that sense Andrea was one decision away from death. Two other light aircraft accidents also occurred when she knew either the pilot or passengers. Part of Andrea's experience of becoming a pilot was dealing with these crashes and making decisions as to whether she wished to continue with her training. The following sections will deal with each of those crashes.

Before I begin this section I would like to mention that the media has a way of dramatizing aircraft accidents. Instead of simply stating that the pilot showed very poor judgment (i.e. was an incompetent pilot) they tend to move in the opposite direction and elevate them to a hero status to make a good story.

As MacMillan (1985) said, "Anyone who is dead is the best pilot who ever lived. That's true. You talk to anyone about them - 'Great pilot!', 'Marvelous pilot.' They weren't, but you never hear anyone say, 'He was a lousy pilot!'" I have difficulty believing that any pilot who flew into bad weather and didn't have enough sense to turn around was a "great pilot."

Crash One

The first crash involved a couple who flew into a storm and crashed, killing both occupants on board. I will not debate the cause or circumstances of this occurrence, however, it was clearly pilot error. In the press the pilot was described as "one of (City's) best-known pilots" and the statement was made that "his death has shocked the province's flying enthusiasts." Although everyone I spoke to was sorry to hear the crash had occurred, the consensus of opinion was that "his days were numbered."

Andrea was in the flying club the day the accident occurred. She gave the following account:

(An instructor) said that two hours or so before this accident happened another guy from the club called and said, "Look I'm landing in (City) because there's a cold front here and I'm not going through it." He (deceased pilot) flew into a forecasted cold front and even though he had the opportunity to turn back and he had the opportunity to land at (City) airport, he chose not to do either.

The immediate impact of this crash was that friends soon started cautioning Andrea, "I hope you don't end up like (victims)." I think this tended to aggravate Andrea more

than assist her. The unfortunate incident did, however, reinforce in Andrea the importance of knowing one's own limits as a pilot. Andrea made the following comments about this accident:

It was so stupid. People at work said he was a dare devil and figured he would die in a plane crash. I thought it was a needless death because he caused it himself. He pushed the weather. He had an opportunity to set down at (another airport). I was really upset because he did not have enough sense to do that.

As Daryush's poem, Air Crash asks, "What happened in those moments" Of course, we don't know and never will know what happened in those last moments before a fatal crash. We can only listen to the stories of those that survive. (A story of this nature will end the Crash section.) Devine (1984), herself a crash survivor, cautioned me about attempting to speculate on the causes of the crash:

Unless you are there, you can't really say. You just hope it won't ever happen to you. Why did he (continue with the flight)? We don't know. It was a dumb thing, he is a real experienced person, maybe something was happening in the cockpit that we don't know about.

Saint-Exupery (1939) described a crash in the desert. Having lost awareness of their altitude, the crash occurred without warning:

All I felt was a terrific crash that rocked the world to its foundations. We had crashed against the earth at a hundred and seventy miles an hour. I am quite sure in that split second that followed, all I expected was the great flash of ruddy light of the explosion in which Prévot and I were to be blown up together. Neither he nor I had felt the least emotion of any kind. All I could observe in

myself was an extraordinary tense feeling of expectancy, the expectancy of that resplendent star in which we were to vanish within a second. (p.194)

Bennett (1984) tried to give some explanation as to why so many weather related accidents were occurring. He claimed that although each encounter with bad weather was unique, there was almost always some warning that things were getting bad. Ground visibility becomes obscured and we gradually lose the horizon. Without the horizon a VFR (visual flight rules) pilot will very soon lose the sense of "which way is up." Bennett (1984) gave some thoughts on why pilots choose to continue "when the world has turned murky." Some thoughts are:

"This will clear in a minute." (Wishful thinking)

"This stuff wasn't forecast." (Rationalization)

"If I turn around, the guys will think I'm chicken." (Peer pressure)

"If I turn around I'll never know if it's really bad." (Self-doubt)

"This can't be happening to me." (Disbelief) (p. 6)

Bad weather is a killer. It is not something to experiment with. If you are not a current instrument rated pilot flying a well equipped aircraft, stay out of weather conditions (cloud) because sooner or later your number will come up. If you feel you are unable to judge when weather conditions are too severe, quit flying.

A Superior pilot is one who stays out of trouble by using his Superior judgement to avoid situations which might require the use of his Superior skill. (Transport Canada)

Crash Two

This crash occurred when a young pilot took off from (City) Airport at night. He flew into deteriorating weather conditions and presumably resorted to flying at a low altitude in order to remain clear of cloud. The aircraft hit a guy wire on a tower and impacted into the side of a hill at full power. The pilot was killed in the crash.

Now I don't really give a damn what anybody says . . . I know that I could be fool enough to crash and kill myself . . . I know I'm not going to do it . . . if I do it . . . it is going to be under some pretty bad circumstances. (Andrea)

This apparent contradiction in Andrea's statement had me concerned. The attitude that "it can't happen to me" is a dangerous one. Pilots are not invulnerable.

Andrea had flown on several occasions with the pilot who was killed in crash two. The fact that she came very close to being a passenger on the fateful flight resulted in the crash having a far greater impact on her than crash one. A second pilot, Ivan, who had also flown with the pilot involved in crash two, reinforced Andrea's belief that one must be very cautious in accepting "free rides."

After the crash, although visibly shaken, Andrea assured me that this unfortunate occurrence would not dissuade her from proceeding with her flight instruction:

I'm chicken of doing stalls and spins and I make no bones about it, but I don't want to crash. I'm not going to give up flying just because (crash two pilot) crashed. I don't think I would ever attempt to do what he did (fly under low cloud).

Ivan, another student, was slightly more advanced in his training than Andrea. He had flown with the pilot who had been involved in the second fatal crash on and off for a year but had noticed a gradual degeneration in his judgment-making ability. Upon completion of his commercial licence, which involved a bit of instrument training, he "really thought he was an IFR pilot." Ivan explained his reaction to the crash:

I know for me there's no fear of continuing the flying or anything like that. I think a lot of it is because before he crashed, I'd already come to the conclusion that I don't feel safe with this guy and I don't want to fly with him anymore. If when he crashed I had thought he was a competent pilot - that might shake me.

The irony of the situation was that even though two low time student pilots (Ivan and Andrea) were able to judge the competence of pilot no. 2, he was not able to perceive his own limitations. Pilot two in fact was "his own worst enemy" in a scenario that can best be described as "self-destruction."

Andrea commented:

I was really upset about the crash because he had obviously gotten in "over his head." When I went on the last flight with him (when they got lost at night) I felt he was constantly exceeding his abilities. He was putting himself into situations where he did not have complete control. It was quite obvious to me at the time.

Crash Three

The third crash involved a larger commercial aircraft. Six passengers were killed when the fog bound aircraft dropped down under the clouds in an attempt to locate the ground and crashed into a stretch of bush. The wreckage indicated the plane plowed into the trees at a slight angle and skidded about 100 meters before coming to rest against some trees. A lengthy investigation which followed concluded that the crash occurred as a result of pilot error.

A prominent political figure was killed in crash three and consequently it received a great deal of public attention. Andrea had spoken to this person on several occasions and was very upset to hear that he had died.

She commented:

This accident . . . well I'm really boiled up about it. This company . . . these guys know better . . . and I think they are really taking advantage of good pilots . . . and who is going to get screwed in the end is the pilots. With the job situation so tight for pilots now some guys will take anything just to keep the wolf away from the door. So they say "It's not VFR conditions but go anyway."

The first three crashes that have been described involved fatalities. We do not like to talk about death and dying in our society. We all want to "live to be 100" as Yeager (1985) suggested. Unfortunately flying involves a spectrum of emotions from joy to sadness and along with the birth of exciting new experiences looms the possibility of death. Fatal crashes are very final. The once sleek

and responsive aircraft is reduced to a pile of tangled metal. The once exuberant pilot is lifeless. The dreams are over. The following accident report describes the end of one pilot's journey:

The aircraft struck the ground at a steep nose down angle of about 180 degrees while turning to the right. The nose of the aircraft dug a hole in the sod field 11 inches deep and approximately 1 foot in diameter. It then nosed over and came to rest inverted about 10 feet away.

Two local farmers Grant Kirby and George Ferrier who had seen the aircraft spiral down and strike the ground rushed over to render assistance. They found that the pilot's body had fallen out of the aircraft so that his upper portion was on the ground while his legs were in the aircraft.

The pilot sustained massive fractures to the skull and fractures to upper cervical vertabrae, face and upper and lower extremities.

The cause of death was given as: shock secondary to skull fractures and fracture dislocation of the upper cervical vertabrae. (Dubin, 1982, p. 927)

The above description was not inserted to shock the reader, I merely wished to reinforce in pilots the terribly unforgiving results of poor flying. In contrast to this rather dreadful crash, I will include an account of a crash landing that had a happier ending.

Just east of (small town) airport, boom, the engine stops. I just made one quick 180 and tried to make it back to the (small town) strip, Thanksgiving Sunday, the highway is just a booming, there is no room to land, there really wasn't much around there. Anyway, about a mile and a half off the end of the runway after losing it three or four times, because this thing doesn't glide, and if you try to use ailerons to turn it, it just falls right out of the sky. Anyway, about a mile and a half off the end of the strip, I knew I wasn't going to make it, because

the runway started coming up in the middle of the wind screen. There was a little field, just a little bald spot in the trees off to my right, so I pulled in there. Well by this time I was beyond that field, so I was actually landing down wind, which is not a good situation in a field, but I got it in, a beautiful landing, just ran out of field. So I took out about four or five trees, and got hung up in a barbed wire fence that spun me around a couple of times. Just totalled that poor machine, but I pointed it between a couple of trees, so fortunately the cockpit stayed perfectly intact. Nobody was hurt but I wrote off an airplane. (commercial pilot, 1984)

The pilot went further to say that "you sure work on everything you were trained" and that everything just "pops back into your head, bang, bang, bang, immediately upon that engine failure."

The pilot and her two passengers walked away from this crash. She kept her head and flew the aircraft, wings level, into the closest open space. There is a saying in flying that "any landing you walk away from is a good landing," so using this definition she executed a good landing.

We have examined the pilot's sense of individual volition including life or death decisions. The freedom of flight can be paradoxical. Although public attention often focuses on the negative aspects of flying, we should not lose sight of the fact that the majority of flights are joyful times.

CHAPTER X

AFFECTIONS

Personal

The Joy of Flying

When heavy on my tired mind
The world, and worldly things, do weigh,
And some sweet solace I would find,
Into the sky I love to stray,
And, all alone, to wander round
In lone seclusion from the ground.

Paul Bewsher

The opening verse of Bewsher's poem describes very nicely the joy of flying. Of all the emotions pilots feel while engaged in flight, personal affections are probably the most difficult for them to put into words. Indeed, poets are far more skillful in describing such feelings.

Andrea described her first feelings in the following way:

One of my friends phoned me the other night and asked, "How's it going out there?" I said, "I'm so excited I can't sleep. I want to do it as well as possible."

I was very interested in hearing Andrea's reaction to her first flight. She gave me this account:

Today I really felt that I had accomplished something. I actually went out, got into the aircraft and went up. It is like meeting someone for the first time and you know after just meeting them, and talking

to them for a few minutes that you and that other person are going to end up being very good friends.

As was mentioned easlier, Andrea had considered quitting her flight training on several occasions. When I asked her why she decided to continue she answered:

I decided I liked it . . . so I'm going to do it . . . it makes me happy, so I'm going to do it. I laugh about the idea of quitting now. I really feel confident with myself now.

It was difficult for me to approach and describe all the emotions Andrea felt as she went through training. Towards the end of the study she started focusing more on what she felt and less on how to accomplish her tasks. Here is an example of some of her later reflections:

You see the experience of flying to me has been many things . . . It has been thrilling, it's been adrenaline producing, it's been satisfying, it's been been frustrating, it's been satisfying, it's been an intellectual experience, it's been an emotional experience, it's just been everything. I don't think there is one emotion that I haven't gone through yet . . . oh yea, and it's been peaceful.

There are a full range of other emotions many pilots associate with flying. Clarke (1984) spoke of the "high":

To me, flying is so exhilarating, you know and it is just such a high in itself. It gets your adrenaline going and when you come down from flying, you feel just great.

Cooper (1984) made a similar comment about the effect flying had on her state of mind:

When I was at University I found that flying was a way to settle my mind. I would just go out, rent a plane for an hour and think about flying. When

I would come down I would be a wonderful person.

Devine made some comments that very closely support Bauer's (1982) contention that when you fly "the world really does go away." Devine (1984) elaborated:

You may need to get away from it all. It could be a private thing. You get in that plane, and it doesn't matter what is on your mind, if it is problems with office, or family, once you get involved in operating that piece of equipment and you take off. . . swish, it is all gone.

Devine's comments also support an earlier notion that when we fly we do in fact have the opportunity to move into a different reality. As Bewsher (1948) wrote:

How small their petty quarrels seem!
Poof, crawling multitudes below.

Bach (1983) went further to support the contention that when we leave the earth in flight we see the world in a different way:

The pilot discovers that the cars down there are toys, after all. That the higher one climbs, the farther he sees; the less important are the affairs and crises of those who cling to the ground.

A few pilots spoke of flying as a power trip, as illustrated in this example:

It's a power trip for me, a personal feeling of controlling that piece of high performance machinery.

Many other pilots described emotions that seemed to point to the addictive nature of flying. Devine commented:

Yes, you hear it all the time. "It's in my blood."

I've seen people sell their cars so they could buy flying time, eat macaroni and cheese so they could spend their UIC cheques for flying lessons. Some people do a lot of crazy things to keep it (flying) up.

Cooper (1984) made the following comment illustrating how addictive flying was for him:

I practically bombed out of engineering because I got so involved in flying. I just became really enthusiastic . . . I just wanted to fly all the time. It was my passion.

Other pilots simply made very bold statements expressing their delight with flying:

There is nothing that I've ever wanted to do again and again like flying.

MacMillan (1985) also felt that flying " was associated with freedom in most people's minds." She felt that the element in flying that caused some people to love it and others to fear it was "the fact that you're not supposed to be there." It is a special kind of reaction to being in an environment you were never designed to be in.

MacMillan added that it was dangerous for people to go flying "because they were feeling down." I tend to agree with her on this point.

A final point was made by Cooper which I feel speaks directly to the issue of the different modes of perception various pilots displayed to me. Cooper spoke of two categories of flyers, people who can fly and pilots.

She explained:

I always thought there were people who could fly and pilots. Pilots being the people who definitely had an affinity towards flying . . . they loved it and it became a great part of them. The people who just drive pieces of machinery around the sky are not pilots by my definition.

Sympathetic Affections

Most pilots that I've met tend to be very sociable people. I think sociable is the word that stands out. Most of them are easy to talk to especially about flying. Get them on to the subject of flying and you have a good conversation going. (Andrea)

One of the elements of flight training that is not described in flight instruction manuals is the pilot community. When you begin flying you do not simply learn how to operate an aircraft but you are gradually accepted by a group of other flying enthusiasts. Many pilots claimed that talking about flying with fellow pilots is almost as exciting as being on the trip in person. Pilots take great pleasure in describing each leg of a journey, the weather conditions, the aircraft's performance and other factors involved in a flight.

Andrea was surprised that the other pilots took an interest in her flight training and were "quite willing to help out with any advice." When Andrea accomplished her first milestone, the solo flight, she received quite a reception back at the flying club:

When I got back they made a big deal of it at the flying club which made me feel pretty good. All these guys came up and shook my hand, "congratulations." Then, of course, they gave me a badge which I was supposed to wear for 24 hours. They also gave

me a certificate and wanted to hear about the flight.

The air traffic controllers at the training airport were also very cooperative with the student pilots. After her solo flight the controllers invited Andrea up to the tower for coffee. While she was up there a student pilot flew into the control zone and entered the circuit on the wrong side (he was doing left hand circuits instead of right hand). Andrea was impressed with the courtesy the controllers showed this pilot. She describes:

They just waited until he was pretty well down and then they cleared him for touch and go. They told him it was a right hand circuit. He (controller) didn't say it in a nasty way or anything because he knew that the fellow wasn't an extremely confident pilot.

On several occasions when Andrea went out to practice circuits by herself at the training airport, the controllers would compliment her on the good landings she was making. It appeared that the controllers were very sympathetic to the plight of the student pilots.

Other pilots who had been flying for longer than Andrea shared many of her feelings about the comradeship between pilots. The following are a few of the comments that speak to this issue:

I used to work for a flying club and I thought I should get out and meet some different people who were not aviation oriented. Unfortunately I found everyone else boring. (commercial pilot)

You become so close to all these people because you have all felt something that is similar. Even though you don't know someone personally you can settle

into a conversation very easily because you share a common bond. (private pilot)

Flying is not the same as golfing. Flying becomes a way of life and not just a casual sport. (instructor)

Devine (1984) felt that pilots obviously had a wide range of personality profiles there was a common factor. She explained:

I think the word is comradeship, yea for sure. The older ones look after the younger ones and there is a real good bond there.

Gwilliams (1984) claimed that pilots looked out for each other all the time. If they are flying and encounter bad weather they radio the information to flight service stations so that other pilots can avoid it. "You don't know the guy but you'd sure help him out." Gwilliams (1984) made another observation of the interaction between pilots at flying clubs:

Students will come and sit at our table or we will go and sit at their table. So I may have over 2000 hours and he's got 20 hours, but we've still got a lot in common. A lot of important socializing happens in the coffee shop.

MacMillan (1985) had some comments on the social interactions of pilots.

Pilots have to be the most boring group of people in the world, because if you enter any room where there are pilots, all they talk about is flying. Even, I've been in groups where we say "we are not going to talk about flying" - I don't know really what the fascination is.

I close this section with some final comments

from a pilot who came to a deeper understanding of the comradeship between pilots. This particular pilot spent over six months in a rehabilitation hospital recovering from an aircraft crash. There were so many pilots coming to visit her that she found it necessary to make appointments with her friends because her parents were never able to get in her room. She commented:

I think they are a close group. You really care about each other. They are friendly people too, at any airport you can talk to any pilot. I think this type of comradeship is pretty unique to the aviation industry. With the crash and all that, the private sector was out there searching and really caring.. They don't mind putting in the time because they always think, what if it was me?

I have described a few of the personal and communal joys of flying. The next chapter will leave you with some special flying memories and Andrea's final thoughts.

CHAPTER XI

FLYING MEMORIES

Many older pilots have told me that although they could have accumulated a greater financial wealth by staying clear of flying, they had a wealth of memories to reflect on that money could never buy.

During the course of this study I listened to many fascinating flying stories. These stories are now part of my own flying memories. I will pass on two of these stories to you. The first story is a recollection of a flight made by a military pilot and the second story is a summary of Andrea's flying experience.

A Night Landing in the Fog

As a military pilot in an instructing situation the administration knew that we weren't keeping our efficiency up. You'd take off with a student, you'd do your circuits and come back down, day in and day out and so we had unlimited use of the planes on weekends. So the place just went (verbal imitation engines) as everybody took off for parts unknown, for cross-country, night proficiency flights with each other and so on and so forth. So we would go to Baja or to Miami or home to New York or wherever at the taxpayers expense; we burned up a lot of fuel. I dropped off a fellow instructor in a little grass field over in Connecticut one night, well it was late afternoon and I headed west going home into upstate New York up by Lake Ontario and it was very quiet. I was just enjoying myself and not really paying attention - pilot error all the way. But I wasn't receiving any incoming information either. This finally dawned on me that I was not receiving any information and the weather was closing in fast and

furious and I wasn't aware of it; no weather reports or anything. I was just being stupid. It had been a long hard week, I shouldn't have put myself in this situation, it socked in under me anyway on a VFR flight (laugh) and of course I was stretching it, we had re-fueled in Virginia and I had made that long detour into Connecticut plus the let down and the fuel expense of a take-off and everything so I was running a little bit low on fuel as I came up to my destination and it was socked in solid. I knew the terrain, I had grown up there and so I knew where things were if I could get a bearing on something. That was the trick of course (laugh). There wasn't anything sticking up through the clouds to give me this bearing but I started trying to get through and I'd get these intermittent responses back. As it turns out later there was a broken lead to my headset. The receiver was receiving, they were hearing me alright, I was transmitting but if I turned my head a little bit it was gone so I had a broken lead in my headset so I managed to keep my head steady and get as much information back and forth between the controller and myself and they listened for me. I came down to what was a safe level to buzz the field area, it was souped right in and they heard me go by and then they started giving me specific bearings and turns and it really put the old instrument pilot instructor to the test. I'll tell you. The airfield was right on the edge of a city and all I had to manoeuver around, dead calm, there was no wind except just enough to create the fog so we didn't have any wind problem and so all the manoeuvers were out over the lake in case I did have to plank it down - that would have been as embarrassing as hell (laugh). If you're going to plank it down, plank it down in the ocean where they'll never get it again (laugh). I made a pass at the field according to his instructions and I couldn't see the field, I wasn't about to set that machine down cause it would have made a big hole if it had hit anything. I went around again, I told him I couldn't see a thing and this was getting dar'. so he said okay you go back to the lake and set up for another approach. This was a T-28 Trojan with Navy configuration which means 4 bladed prop, 1500 horsepower. The torque would just flip you right over on your back but it was heavily powered for the carriers. So they called me in. I made another run. As I came down over where they told me I began to see the runway. It was lit up just

like daylight, I couldn't believe it. Cut right through the fog, it was a beautiful sight to behold. I touched down and the engine quit. Rolled to a dead stop in the middle of the runway, embarrassing as hell. All the lights were guy's cars, the fire trucks, everybody had their headlights on all down the runway (laugh). I couldn't believe it, this airtraffic controller really took charge. He had the whole thing worked out, then they all honked their horns and drove off (laugh).

Andrea's Recollections

I have learned that very few things in life are linear. It's (her experience of flight training) not as simple as first impressions might seem. Although the process (learning) seemed to be continuous, really when I think back I broke off from the pathway and sort of remained in a "holding pattern" until I gained the confidence to move on. Fear and respect were sitting on either side of the experience.

So here I was at the starting point (pointing at a circular diagram she drew) not knowing a damned thing about flying. The fear I experienced at this point was based on what I already knew about flying. Now different pilots will enter at different phases (different levels of pre-understanding). Some pilots will know nothing about flying and you know their grandmother might say, "your uncle died in a crash" or something and all you know is what you read in the papers.

It helped me to have some post-secondary science background. I took physics, math, meteorology and I even flew a few times in airplanes. I was more pre-educated than some people.

The first few lessons are really a gas because your instructor pretty well does everything for you and you just go along for a joy ride. Then he says to you, "Well I think it's time you took the controls now." He does all the radio work. You don't have to worry about reaching down and picking up the mike. He says, "Well you are going out to (training) airport." That's only twenty miles but for me it was such a long trip and so complicated that it might as well been across the continent.

So you are climbing out and you are not even at 4000 feet and he says to you, "Well do the levelling off procedure." You say, "Wow, I get a chance to do this thing, level, power back, trim, level.", and you think you have really done something.

So you are going along and you think this is really good and then he says, "Hey, we are coming into (training) airport now." "We are going to land this thing and you are going to do it." This is one of those times that I spun off that circle into a holding pattern.

So he (instructor) says, "Okay, she doesn't know how to land, so it's time we concentrate on that." I guess we did take offs first but I am still (in my mind) in that "pattern" thinking about the landing. All you think about is landing, landing, landing.

So you are going round and round in this circle (of understanding) and then one day you say, "Hey, I know how to land this thing.", and you go for your next flight and you have this aura of confidence and well being and calmness about you. You get out to (training) airport and he (instructor) says "full stop at the next circuit." You know, "okay, this is it. . . you know it . . . and he says very coolly, "Go up and do one by yourself.", and you go: "Really? Do you mean it? You're ready. Away I go."

After I did my first landing solo then I moved out of that little holding pattern and progressed further on in the larger circle (of understanding).

The fear does not always diminish as you move on in your learning. I have to give you the full explanation. I apologize I'm very verbose and so if this is difficult to articulate - so here you are (points at her circular diagram with various sub-circles) and you are going along saying, "Boy am I ever good, I can land, I can take off, I can do all these things." For me I thought, "pretty good." I was pretty excited. When I landed on that first solo I could have rung my shirt out, the adrenaline was flowing.

So I'm going along and all of a sudden he said, "You better learn how to navigate." Back into another holding pattern. Then the weather gets bad and you lose some time and the flow around this circle (pointing to diagram) breaks up a bit. Take

offs were nothing, landings were the big thing.

When you are just a beginner and you start flying in turbulence or bad weather it really sets you back. The weather was bad for a while and I didn't get to fly for a long time. Then I come back and I don't really know what I am doing again. I don't feel comfortable about taking this thing off the ground. I had to backtrack a bit and then I gradually brought myself up to par.

There is a point after you have made enough flights where even if the weather is bad you can still progress, you don't have to backtrack. It's bad when you are unsure of your flying skills and are worried about the weather also. Your attention is split. Anyway, you cautiously progress, accepting flying in poorer weather conditions. When you can fly off by yourself to practice, your learning really accelerates.

Then I had to do specialty landings and take-offs in a cross wind. I think I'm in another pattern now where I have to do all my upper air work, my stalls, my spins, my forced approaches until I'm ready for the flight test. This model (diagram) should be a three-dimensional model.

It's funny how it works. You start off and you really progress well. You learn to land, you do your first solo and then you seem to learn like crazy. You learn how to navigate, all of a sudden you get the hang of it. You know the whole process is a kind of life cycle. When I get my private I will just begin another cycle when I start my night rating.

Flying to me has really meant developing a respect for the environmental conditions. By that I don't just mean the weather but also learning how to handle the comments from the people at work and my own self-imposed pressures. I wanted to do everything perfectly. Flying was kind of embedded in the rest of my ordinary life style. Everything had to make an adjustment.

CHAPTER XII

REFLECTIONS

Introduction

As is often the case in studies of this nature, the researcher discovers far more than he/she ever expected at the outset of the study. This is not uncommon with a journey of any sort and perhaps it is the search for the unexpected that ultimately beckons to us. Another parallel between travel and research is that when the "journey" is over we tend to recollect the highlights of the event first. The following section will take a final look at the landscape which has been traversed. I take this opportunity to comment on my experiences as a researcher, present the critical perspective on flight training that has been avoided to this point and most importantly to explore some of the "landmarks" that have appeared on the horizon and subsequently slipped out of sight as the journey progressed. Landmarks allow us to determine where we are at any given time. In this sense, although aviation was used as the central focus of this study, many of the universal dimensions of human experience were explored and described.

Looking at the Pilot's Domain

The circle metaphor is an appropriate image for flying. As Andrea suggested, her experience was a series of "holding

patterns" which occurred within larger spheres of movement. Her circle never ended and was therefore never completed. Understanding of any situation is never final. The further appropriateness of the circle as a symbol for flying becomes evident when one focuses on the simplicity of the circle. In like manner flight is a very simple event. Air flows over the propeller and wings in a circular motion. The engine reciprocates in a circular movement. The wheels roll onto and off of the runway. Flying is an effortless activity.

The aircraft works in cooperation with the environment to achieve flight. Although the aircraft "flies itself," it cannot make the decisions that will ultimately keep the pilot alive. Only the pilot can make decisions. A multitude of factors influence the success or failure of any given pilot, however, one could safely say that the longevity of a pilot is directly related to judgment-making ability. Pilots are in a constant state of development so therefore the circle of understanding never ends. Pilots who live to fly for a long time have developed a deep understanding of self.

In the exploration of flight training a number of themes appeared which seem to be essential to the flying experience. These themes emerged from the text and could be identified and categorized in a meaningful manner. For me it was important to keep the flow in my writing smooth and yet direct. In flying, as in writing, smooth and

coordinated transitions from one place to another result in a more satisfying journey for the traveler.

One of the themes focused on flying as a performance. What is the "baggage" that student pilots bring with them to their first encounter with flight? Where are the roots of their preconceptions? Why are people attracted to flying in the first place? People take up flying for many reasons but the real attraction is difficult to determine. Suffice it to say that flying gives pilots a kind of experience that cannot be equalled on earth. Flying is the last available frontier for many people in a world that has become very ordinary. Flying offers a new challenge. Less than one half of a percent of the Canadian population can legally fly an aircraft. This places pilots in a special group.

Pilots read flight training manuals, airport directories, journey log books, weather reports, flight plans, maps, and many other texts. In addition the pilot "reads" the clouds, the instruments, the movement patterns of other aircraft and the invisible but ever present force of a cross wind. The pilot's "text" is broad and varied. The information collected from these various texts must be analyzed, evaluated and decisions must be made. The situation a pilot is about to encounter must be assessed against prior experience and the pilot's perception of proficiency. The question, "Can I handle this situation?" must be asked and answered. Skill must equal or surpass

the real danger of any given situation if the pilot wishes to survive. There does not appear to be any evidence to support the notion of a "natural pilot," however, highly skilled pilots give the impression that they have special talents.

The evolution of aviation from the flights of the Wright Brothers in 1903 to the supersonic flights of the Concorde is a story of romance with a machine. The romance came into full bloom with the advent of modern technology. The airplane began as a flying machine and developed into a computer that flies. Technology has increased reliability but at the same time it has deskilled pilots and encouraged a feeling of invulnerability. Aircraft are sensitive to control inputs and good pilots develop a sensitive "feel" for their craft. Many pilots claim to be able to clear their minds of all distracting thought patterns when performing the more stressful manoeuvres. The ability to "turn off the chatter" on the roof of the brain (Pearce, 1973) allows the pilot the opportunity to focus on minute sensory inputs. Concentration occurs more easily if the pilot is able to relax.

What is attractive about moving through the sky? For those who love to "get away from it all" there is no better place than the "wild blue yonder." Movement through any large open space is enjoyable but the pilot's ability to move freely and effortlessly into spaces where

people do not belong is a special thrill. Clouds, wind, storms and turbulence also inhabit these spaces and the wise pilot learns to respect these obstacles. The cockpit of a light aircraft is a very small space. The instruments and controls are strategically located so the pilot can "read" vital information and make adjustments to the craft's movements. Movement in space requires that the pilot develop a keen sense of where the aircraft is in relation to stationary landmarks on the ground and dynamic landmarks (other aircraft) in flight. Failure to do so will result in being lost or the worst of all catastrophies, a mid-air collision. The landing is the most difficult flight phase and in many ways it is similar to a target game, the aircraft being the projectile, the runway being the target.

The primary sensations a pilot relies on are vision, touch, and sound. The majority of sensory information comes to the pilots through visual cues. The importance of good visibility in flying is verified by accident statistics which clearly illustrate the high percentage of weather related crashes. The loss of the horizon as a reference point almost always results in disaster for VFR (visual flight rules - must remain below cloud) pilots. The pressure that must be applied to flight controls to change pathways is also an important sensory cue. The "feel" of the aircraft is transmitted to the pilot through the controls. The controls are the "telegraph lines" between the pilot's touch receptors

and the environmental conditions. The pilot can react more quickly to touch and sound stimuli than to visual stimuli, therefore it may be important to consider the nature of these stimuli more carefully in flight training.

Flying occurs across time, but it also can suspend time. Time can be experienced in many different ways when flying. Various landmarks in time can be cited along the pilot's "journey." Time is used as an indicator of aircraft performance. The timeless nature of cross country flight quickly vanishes when the engine quits and there are only minutes before you must "make a landing place." Aircraft are built strong enough to last for decades but they will only remain aloft for a limited amount of time on each tank of fuel. Pilots "collect" time in their log books and logged time often symbolizes a pilot's worth. Pilots spend more time thinking about flying or waiting for weather than they do flying.

Flying is the ultimate test of a person's common sense. Pilots who are shy on common sense don't live long. The freedom that flying offers must be exercised cautiously. Beginning pilots do not know enough about the possible outcomes of in-flight situations to evaluate the severity of many situations. The penalty for poor flying can be death. Pilots who kill themselves have made a wrong decision somewhere in their flight. There is some question as to whether flight training can teach decision making skills. Airplanes

and weather do not kill pilots but rather pilots' inability to make sound judgments results in disaster.

Flying is described as a "passion sport" by many flying enthusiasts. Romance, love, and joy are words commonly associated with flying as work because they enjoy the occupation so much. Pilots form a unique cultural group in that they are always prepared to share time and space with other aviators. Flight appears to transcend all geographic and cultural barriers.

One of the great features about flying is that flights can be re-lived over and over again in our memories. As pilots grow older they may discontinue flying but they take their memories with them. Ultimately we evaluate our life's efforts on the strength of our memories and pilots are fortunate in that they are able to draw from their rich collection of spectacular and unique images.

If you are concerned that your life is a bit too ordinary, visit your local flying club the next time you venture out to an airport. The only regret pilots expressed to me was the concern that they had started flying too late in their lives. I suggest that you give it a try.

The Methodology of the Study

I was satisfied that the approaches used to gather information were appropriate for this study. My decision to venture into the aviation community was reached after considerable research and experimentation with a variety

of methods of data collection. After more than a hundred interviews with Andrea and other pilots I was satisfied that my data were a good reflection of the pilot's experience. I knew this method would work as I had piloted it in previous studies.

There are piles of Andrea's thoughts lying on my shelves. At the time I collected them I did not know what they contained. As I worked with her ideas in the same way an artist works on his canvas, the images started to take form. Many of the comments other pilots made inspired the insights that were necessary to make sense of Andrea's stories. The information I accumulated casually and often unexpectedly eventually started falling into place. In research of this nature one must be patient. In time the text reveals the message you wish to share.

Upon reflection, I have concluded that the method I chose was "messy" and time consuming. At the same time, there was no other way to accomplish the kind of "thick description" I felt was necessary to give the reader a real sense of what it is like to become a pilot. A great deal of feedback (which I sought actively) from many very knowledgeable scholars in the education community gave me the assurance that, while the method may prove frustrating at times, the study was meaningful. I am very grateful to these people because without the benefit of their experience I would have been floundering

with questions of method many times. I realize that it would have been much simpler to streamline a study and conduct it in a laboratory setting focusing on phenomena amenable to certain kinds of experiments. My review of literature indicated that there were enough isolated process questions being dealt with by other researchers; my interest was in "real-world issues."

The approach used in this study gave me an opportunity to move into pilots' domains and gain a better understanding of what being a pilot meant to them. Is it possible to re-create the real world in a laboratory setting? Flight simulators are different from real aircraft. Being out of control in an aircraft is not the same as being out of control in a simulator. No one has ever died in a simulator crash.

The approaches I used to gather information in this study were straight forward. Many hours were spent conversing with pilots about their involvement in flying. The conversations were transcribed, analyzed, and written up in such a way that the average reader could "make sense" of them. Additionally, I documented everything I observed during the interviews (in field notes) and my own insights (journals). The "system" I developed allowed me to account for all sources of information, the date, time, source, circumstances, and information acquired. The detailed account of my personal thoughts gave me a deeper

understanding of self and in particular some sense of when and where I did my "best critical reflecting."

The interviews were conducted in a variety of locations. Primarily, I asked the interviewee to choose his/her location. These locations included lounges, aircraft hangars, flying clubs, hospital rooms, offices, homes and the cockpits of aircraft. Airports are a good location to conduct these interviews. The pilots were very generous with their time and I encountered no difficulty conversing with them.

I am satisfied with the method. The pilots and academics who read my interpretation of the pilot's world have indicated that it "makes sense" to them.

The present research was my first attempt to bring meaning to the lived experiences of pilots. There was never any question in my mind as to the topic; however, it took many years of searching and enlightenment from a "new wave" of education scholars before I was able to feel comfortable with my approach. The approach was well established before I commenced the study. Once Andrea began her flight instruction I had to "keep pace" with her. It is difficult to go back and pick up information; data must be collected in an organized fashion on an ongoing basis.

My interviewing technique improved as the study progressed and I now feel confident I could approach almost anyone and conduct a meaningful interview. I have concluded that the critical factor to remember is that these people (the interviewees) are doing the researcher a favor.

They are giving up their time and therefore the interviewer has an obligation to make sure they leave with a feeling of time well spent.

I believe it is the appropriate time to wrestle with a key question "lurking in the shadows" since the outset of this study. Do pilots think all these things while flying? Wyatt (1984) claimed that writers such as Richard Bach "made a heck of a good living describing flying in a poetic way; they make flying more than it really is." My suggestion is that many of us go through life relying solely on instrumental calculative reasoning and therefore are unable to view flying (and many other experiences) in their fullness.

But what of this question of dual modes of perception; the two modes of consciousness? Ann Morrow Lindberg (1939) questioned Antone de Saint-Exupery's writing on this very point. How could he see so much and fly at the same time?

Beautiful, however, as the writing is, what amazes me almost more, in a kind of childish incredulity, is the flying. How is it possible, I ask myself, that he kept his mind on the gas consumption while pondering the mysteries of the universe? How can he navigate by the stars when they are to him "the frozen glitter of diamonds"? Did he really think those things while he was flying? And is it possible, then, that a person can be that rare combination, the actor and the onlooker, at precisely the same moment? (p. 51)

So the question still remains, did Andrea and my other sources think all those things while they were flying or was their mind really empty as was suggested earlier? Lindberg was asked, "Did you really think all those things

you describe in your book just as you were flying around the Pagoda?" Her response was, "No, I couldn't say I had Certainly not those precise words, sometimes not even the thoughts were formed" (Saint-Exupery, 1939, p.17).

I answered this using some of the reasoning that Lindberg (1939) used to support the validity of her interpretations. If the words and thoughts Andrea used to describe the take off (and other events) were not exactly congruent with the way she experienced the event, she at least had a sensation. As Hayakawa (1978) described, the word is just a representation of the event and therefore we should not expect it to be the event. As Lindberg (1939) stated:

I had an emotion; and I gathered the seed. I plucked off the hour hastily, in passing, without cracking it open. I took it home with me, not knowing when that pod would deliver its secret to me, but hoping that some day it would, if only I were patient. (p. 8)

I have no difficulty attributing Andrea's present thoughts to her past actions. However, those who are accustomed to linear thought, cause and effect, may not agree with me. "The events of life are not notches in a perpendicular bar, one above the other. They are not imbedded in one spot in time." (Lindberg, 1939, p. 10)

My contention is that detailed recollections of the various experiences of flight training would be useful to those who have never flown but are interested. I raise this point now because as I work through the many sources

of information I have assessed, I realize that a more detailed account on the part of Andrea would have been helpful to me. It is difficult as a researcher who is already using up many hours of a subject's free time, to demand high quality daily diary entries (unless perhaps you pay your subject).

In a follow up study I plan to undertake, focusing on instrument training, I will do a study of self. In this way I will be certain to collect the kind of detailed information I need to do a complete description.

There are some ethical concerns that must be addressed. Many of the individuals interviewed revealed information that was confidential in nature or at least could lead to embarrassment should the sources be disclosed. I made a special effort to avoid printing this kind of material and in some cases masked the identities of the pilots. For example, most pilots feel it is important to share any insights they might have gained from a crash landing but they don't necessarily want "the world to know" they were the pilot-in-command at the time of the crash.

In conclusion, I would say that the task I was striving to complete was accomplished. As I moved through the study I found I had to consciously control my urge to become more critical in my comments. Having kept the body of the paper relatively free of critical observations I feel it is necessary to include a section which will address some of the more glaring issues.

Flight Instruction - A Critical Perspective

Although Andrea had a very competent flight instructor, I believe high quality instruction in flight training is the exception rather than the rule. I base this observation on my own experiences in flight training, on the comments of many other pilots, and on the results of an instructor questionnaire completed in 1984 (Winther, 1984).

Most instructors use instruction (and students) as a means of building hours in order to gain the flying qualifications for more "interesting" flying jobs. Pilots perceive instructing as being the "bottom of the pile" in the aviation profession. I use the term "profession" loosely. Can a few hours of "teacher training" elevate an eighteen year old commercial pilot to a professional teaching status? Most teachers require a minimum of four years of university education before anyone will allow them to teach.

A further irony of the situation is that the least qualified instructors (beginners) are always given the least experienced pilots (student private pilots) to teach. From my observations many of these rookie instructors see their job as protecting the aircraft from serious damage while the student pilot learns how to fly it. In summary there is a naive notion in Transport Canada that anyone who can fly can teach.

I believe a considerable number of general aviation accidents could be traced back to poor quality initial flight training. The present accident investigation procedures do not allow investigators to go back far enough in the history of a pilot's flight training to determine if a relationship might exist. My contention is that many of the accidents that have been attributed to "pilot error" may well be the result of "instructor error."

The point I would like to make is "Don't leave the selection of your flight instructor to chance". Student pilots are investing close to ninety dollars per hour for flight training. For that kind of an investment they are entitled to first class instruction. A suggestion for novice pilots might be to phone the local office of Transport Canada and ask to speak to the licencing inspector. It is their job to evaluate instructors and they would likely provide a list of the top instructors. Personally, I found the adage "The older the wiser" held true for flight instructors.

There are few instructors who could be termed professional instructors. That is, they have chosen flight instruction as a career rather than a stepping stone to a higher paying, more prestigious position. It is very important to find a person who is sensitive to your state as a beginner and is teaching because he/she enjoys helping students learn. This of course is no different than

evaluating teachers in any other setting. The difference will likely be that the flying instructor has very likely never studied teacher education. Many instructors have the knowledge and skill but have difficulty imparting it to students.

A second concern is the context in which flight instruction takes place. The instruction is conducted by private enterprise (profit motive), the text books are frequently published by aircraft manufacturers (profit motive) and the curriculum content and evaluation procedures are dictated by Transport Canada. None of these agencies have experience in the education field. Once again, the notion that "anyone can teach, evaluate, and design curricula" is pervasive. My suggestion is that flight instruction should be moved into a more academic setting where the instructors see their prime objective as teaching rather than trying to scrape together enough hours to make a living. The present arrangement is not good for anyone concerned.

A third concern is the lack of aviation research being conducted in Canada. The few individuals who have the desire and expertise to conduct research are not given any encouragement. No one in Transport Canada wants research surfacing that might upset the status quo. Instead they spend millions of dollars investigating crash sites. It is almost impossible to acquire funding

or any other form of assistance from Transport Canada; it is a closed system.

My suggestion is for Transport Canada to take a realistic look at the quality of flight instruction in Canada. In order to accomplish this it would be advisable for them to hire an independent outside researcher who could offer an unbiased evaluation.

As I approached the completion of the study, I had the good fortune to be able to conduct a series of interviews with Heather MacMillan, an accident investigator for Transport Canada. The interviews gave me the opportunity to verify my interpretations about Andrea's experience as well as to probe deeper into some of the accident issues that had emerged during the duration of the study. What follows then are a few insights given by a professional pilot and investigator which I hope will be helpful to other pilots.

My first questions focused on the notion that there must be certain common characteristics among the pilots who have accidents. MacMillan (1985) responded thusly:

I am moving away from the idea that there are people who are accident prone . . . In the past three years I've decided it works on fate. I know that sounds ridiculous. There are a lot of things you can do to safeguard yourself but I can not draw a picture of an accident-prone pilot or an accident candidate anymore.

During the course of Andrea's flight training I became aware that although forced approaches and

emergency procedures are practiced in flight training, little instruction focuses on how to crash. MacMillan spoke about the "how to crash question":

If you maintain control of your aircraft. If you keep flying it, okay you can't keep it at altitude because the engine's gone or something has gone wrong . . . but you don't let it get into a spin or a spiral. You keep flying it to ground contact. I couldn't give you an absolute percentage but I would say, feeling quite comfortable with the figure . . . 90% chance you are going to walk away with just a couple of cuts and bruises . . . walk away . . . trees . . . I don't care where you put it down.

The message that came through time and time again in MacMillan's comments was, "Stay calm, Know your aircraft and keep it under control."

The following observation was made about people who experience an engine failure in a twin engine aircraft:

You're always taught all this single engine procedure, as if it's going to work, which it generally won't if you've got a load on board. Most of the light twins on a summer day, full load - forget it . . . let it take you to the ground but no they try to keep it up there and they go below VMC and they corkscrew in and you're dead. The difference between life and death is maintaining control of the aircraft to the ground. It's as simple as that.

Although dozens of issues and concerns were discussed during our hours of "critical dialogue," I was left with the impression that there were many areas in flight training and accident investigation that required further research. Aviation research in Canada is almost non-existent. I am confused as to why the federal government has not made this a higher priority.

I also have several concerns with the impact of technology on general aviation as it affects student pilots. The first one is that the beginning pilots are given the impression that the instruments will save their lives. As Andrea said, "I might be able to keep myself alive." I believe this impression is reinforced primarily by the aircraft manufacturers who through their advertisements give the impression that "high tech" flying is in, and you need an impressive stack of radio equipment in your aircraft to be a "real pilot." The text books most student pilots use in their flight training are produced by the aircraft manufacturers and most of the illustrations display elaborate panels filled with instruments. Instruments do not save VFR (non-instrument rated) pilots; common sense and adequate flying skills keep pilots alive.

Most fatal accidents occur during cross-country flights in bad weather. (Accidents will be discussed later in the study.) Pilots are pushed to low altitudes by cloud, get lost, panic and often crash. One poor judgment follows another in a case like this. The key thing is to know where you are at all times. To me, knowing you are on a radio beacon running between two stations is not good enough when you hit bad weather. I believe beginning pilots should know exactly where they are on the map that is sitting in front of them so as to enable them to make sound decisions as to where the

most suitable airport might be. A wise pilot will land and sit out a storm.

I agree that in general, aircraft are safer to fly because of technology (although the basic design has not changed in decades); however, I think many pilots put too much faith in the dials (with the exception of the "bush types"). Is there not a sense of invulnerability or false security that comes from this heavy reliance on gadgetry? I mean, under all that beautifully illuminated hardware there is an aircraft that basically flies like a J-3 Cub.

Not wishing to depart on a negative note, the following sections will attempt to highlight some of the more positive dimensions of this research.

The Universal Dimensions of Human Experience

Holding Form

The high diver walks to the edge of the platform. His/her toes are carefully inched placing the body in a precise, balanced position. Each body segment is perfectly aligned. Suddenly the arms drive upward and the body rotates and twists simultaneously. The diver keeps perfect form slipping into the water gracefully. Keeping form is an integral part of many physical activities. The present study illustrated many examples of the importance of maintaining full control of one's thoughts which inevitably results in full control of the aircraft. Whether

one is a diver, gymnast, concert pianist, surgeon, artist or pilot, the successful completion of the task can only be accomplished if full control is maintained.

The rhythm and flow that proficient performers exhibit is a sign of being in control. Harmony must exist between the pilot and the aircraft. The sensitive and aware pilot knows his/her aircraft and any change in the normal operation is quickly sensed. This person - machine relationship is not unlike feeling a vibration in the front end of your car indicating you might need an alignment or knowing that you must pump the gas pedal three times before attempting to start it. In other words, part of being able to hold form is dependent on "knowing your machine."

Accomplished artists, speakers, musicians and even runners give the illusion that little skill is required to perform in their respective areas. A sweet melody, a skillful brush stroke or a relaxed movement pattern cannot be accomplished without holding form. This may be where the notion of the "natural" has originated. Skillful performers exhibit a certain efficiency of movement that leads us to think they always performed this way. The fact is, most skill is learned.

Risk Taking

What draws the sailor out to sea? What attracts mountain climbers to balance their lives on a toe hold? Why do people fly? No doubt there is some attraction

for living first hand with the wind and the rain; however, there also appears to be in all of us a desire to take certain risks. For some people risk taking may be leaving the security of their private space and walking through a shopping mall. For others hiking in the mountains might be considered quite daring and for still others only an experience such as sky diving would have a perceived element of risk. We all seem to have different thresholds in our perception of the relative risk of any given situation.

I suspect the media has a significant influence over our perceptions of what "living life to its limits" might be. Risk taking, whether it be high speed cars, daring feats or cheating on one's spouse, seems to be a dominant theme on television.

If we removed risk from many of the activities we participate in we may have removed the element that holds the greatest attraction for us.

Exploring the Limits of Uncertainty

How is it that on some occasions we know how far to push ourselves before we should turn back and on other occasions we trudge blindly onward? When is the current too swift for our canoe? When is the race too long to run? When is the hill too steep to cycle?

In many situations we are faced with the decision of proceeding or turning back. We are often caught in

situations where we do not know the consequences of proceeding. At the same time we know that we learn by experiencing the world around us and only by pushing ourselves a little farther into unexplored territory can we expect to gain new insights. Exploring outer space is a classic example of this urge mankind feels.

In some ways I perceived the present study as an opportunity to tread on "virgin territory." When we approach a new landscape we are never quite sure what we will need to traverse it. The best we can do is speculate on our need by looking at other situations that appear to have some resemblance. In that way I "borrowed" from sociology, ethnography, anthropology, and phenomenology in order to develop my research approach. I felt the study itself was exploring the limits of uncertainty and perhaps more attention should be placed on how we can facilitate lateral movement in research across several disciplines instead of focusing on vertical movement within a restricted academic space.

Visual Acuity

Flying at ten thousand feet one can see for a hundred miles in every direction. When the ceiling is formed by a cloud layer and the pilot is forced to fly closer to the earth, forward visibility is reduced. If rain begins to fall visibility is reduced once again. Flying into cloud reduces visibility quickly to the limits

of the cockpit space and forces the pilot to concentrate on several three-inch circular gauges in order to maintain control of the aircraft.

In many activities we experience this constant change in perspective. In hockey for example, the player moves quickly from viewing the entire ice surface to focusing on the corner of the net. A narrow angle of view restricts the performer's perspective. A wide angle of view allows the performer to gather more sensory information and generally results in a less stressful environment.

In our every day lives we are constantly changing our perspectives to a long range distant view ("What will I do next weekend?") to an immediate view ("Am I prepared for the lesson next hour?"). We seem to develop an almost intuitive sense of how to keep both of these important perspectives in sight without allowing them to interfere with our present productivity.

Keeping the Body and Power in Balance

There is some sense in flying that at certain times the aircraft completely overpowers the student. As time progresses and the student has been exposed to a wider variety of experiences the student gains more control.

The notion of maintaining a balance between body and power is common throughout many activities. One need only look at the transition that children make from push

cars to tricycles to two-wheelers to see this progression. The asymmetrical balance between the child's body and power occurs when children get on motorized mini-bikes. The great number of fatal accidents involving children on vehicles of this nature supports this claim.

The relationship between people and machine is a phenomenon that deserves further exploration. The statement, "He/she became an animal behind the wheel of a car." is often heard. We all probably know someone who gets "carried away" with driving. Some people see their cars as almost an extension of themselves. What is it that causes people to change when they are "strapped into all that horsepower"?

Being in Harmony with Nature

In the Eastern cultures they have wind chimes. The chimes only tinkle when the winds are calm. As the wind blows through the chimes it makes you conscious of the wind spirit by tinkling. If there is a gale blowing on it, the tinkling isn't as melodic. It's their way of reminding you that you can't be in touch with nature when it's aggressive on the body. There are moments of calmness when you feel the wind but just enough to be with nature and not battling against her. (Jagodzinski, 1985)

In flying, canoeing, hiking, camping and most other outdoor activities it is easier to be in touch with nature when it is calm. The destructive force of nature must be understood and respected by all who hope to survive in the outdoors.

When I Fly

When I fly I feel the spirit of the aircraft lifting

my spirit into the clear blue of the sky. I see the world below in a constant state of flux. What was once the Old Dawson Trail is now the Trans Canada Highway. What was once a beautiful meadow is now an open pit mine, but the sky is the same sky it has always been. I enjoy that thought. I leave the sky the way I found it.

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APPENDIX 1

CHRONOLOGY OF EVENTS IN ANDREA'S PRIVATE PILOT TRAINING

APPENDIX 1CHRONOLOGY OF EVENTS IN ANDREA'S PRIVATE PILOT TRAINING

1. Friday, Jan. 13, 1984 - first interview with Andrea.
2. Saturday, Jan. 14, 1984 - second interview with Andrea prior to Flight No. 1.
3. Sunday, Jan. 15, 1984 - Andrea completes instructional Flight No. 1.
4. Sunday, Jan. 15, 1984 - third interview with Andrea.
5. Friday, Jan. 20, 1984 - fourth interview with Andrea.
6. Saturday, Jan. 21, 1984 - Andrea completes instructional Flight No. 2.
7. Saturday, Jan. 21, 1984 - fifth interview with Andrea.
8. Sunday, Jan. 22, 1984 - sixth interview with Andrea.
9. Friday, Jan. 27, 1984 - Andrea completes instructional Flight No. 3.
10. Friday, Jan. 27, 1984 - seventh interview with Andrea.
11. Sunday, Jan. 29, 1984 - Andrea completes instructional Flight No. 4.
12. Sunday, Jan. 29, 1984 - eighth interview with Andrea.
13. Thursday, Feb. 2, 1984 - ninth interview with Andrea.
14. Friday, Feb. 3, 1984 - Andrea completes passenger Flight No. 5 with A.P. (A.P. kills himself in crash Feb. 27)
15. Saturday, Feb. 4, 1984 - Andrea completes instructional Flight No. 6.
16. Saturday, Feb. 4, 1984 - tenth interview with Andrea.

17. Sunday, Feb. 5, 1984 - Andrea's Flight No. 7 (with me in my Cessna 180).
18. Thursday, Feb. 9, 1984 - Andrea completes instructional Flight No. 8.
19. Sunday, Feb. 12, 1984 - eleventh interview with Andrea.
20. Saturday, Feb. 18, 1984 - Andrea completes instructional Flight No. 9.
21. Friday, Feb. 24, 1984 - Andrea completes instructional Flight No. 10.
22. Friday, Feb. 24, 1984 - twelfth interview with Andrea.
23. Saturday, Feb. 25, 1984 - Andrea completes instructional Flight No. 11.
24. Saturday, Feb. 25, 1984 - thirteenth interview with Andrea.
25. Sunday, Feb. 26, 1984 - Andrea completes instructional Flight No. 12.
26. Sunday, Feb. 26, 1984 - fourteenth interview.
27. Sunday, Feb. 26, 1984 - Andrea phones to say she has a chance to fly with A.P. tomorrow - we decide this is not a good idea - he is not a safe pilot.
28. Tuesday, Feb. 28, 1984 - Andrea phones to tell me A.P. crashed and killed himself.
29. Saturday, Mar. 3, 1984 - Andrea completes instructional Flight No. 13.
30. Saturday, Mar. 3, 1984 - fifteenth interview.
31. Tuesday, Mar. 6, 1984 - sixteenth interview.
32. Thursday, Mar. 8, 1984 - Andrea completes instructional Flight No. 14.

33. Saturday, Mar. 8, 1984 - seventeenth interview.
34. Monday, Mar. 26, 1984 - eighteenth interview with Andrea - she decided to quit flying for a while!
35. Friday, May 4, 1984 - nineteenth interview.
36. Tuesday, May 8, 1984 - Andrea's Flight No. 15.
37. Tuesday, May 8, 1984 - twentieth interview.
38. Wednesday, May 12, 1984 - twenty-first interview.
39. Saturday, May 12, 1984 - Andrea completes Flight No. 16 with me.
40. Monday, May 14, 1984 - Andrea completes instructional Flight No. 17.
41. Monday, May 14, 1984 - twenty-second interview.
42. Tuesday, May 15, 1984 - Andrea completes instructional Flight No. 18.
43. Tuesday, May 15, 1984 - twenty-third interview.
44. Friday, May 25, 1984 - twenty-fourth interview.
45. Friday, June 8, 1984 - Andrea completes instructional Flight No. 19.
46. Friday, June 8, 1984 - twenty-fifth interview.
47. Saturday, June 9, 1984 - Andrea completes instructional Flight No. 20.
48. Saturday, June 9, 1984 - twenty-sixth interview.
49. Tuesday, June 12, 1984 - twenty-seventh interview.
50. Saturday, June 16, 1984 - Andrea's SOLO FLIGHT 21.
51. Monday, June 18, 1984 - Andrea completes instructional Flight No. 22.

52. Tuesday, June 19, 1984 - twenty-eighth interview.
53. Saturday, June 23, 1984 - Andrea completes instructional Flight No. 23.
54. Saturday, June 23, 1984 - twenty-ninth interview.
55. Sunday, June 24, 1984 - thirtieth interview.
56. Thursday, June 28, 1984 - Andrea completes instructional Flight No. 24.
57. Thursday, June 28, 1984 - Andrea completes Flight No. 25. - Aztec twin.
58. Sunday, July 1, 1984 - thirty-first interview.
59. Saturday, July 7, 1984 - Andrea completes instructional Flight No. 26.
60. Saturday, July 7, 1984 - thirty-second interview.
61. Sunday, July 8, 1984 - Andrea completes instructional Flight No. 27.
62. Sunday, July 8, 1984 - thirty-third interview. (Re: her solo flight-City Airport.
63. Monday, July 9, 1984 - thirty-fourth interview.
64. Saturday, July 14, 1984 - Andrea completes instructional Flight No. 28.
65. Saturday, July 14, 1984 - thirty-fifth interview.
66. Sunday, July 15, 1984 - Andrea completes instructional Flight No. 29.
67. Saturday, Aug. 18, 1984 - Andrea completes instructional Flight No. 30.
68. Tuesday, Aug. 21, 1984 - thirty-sixth interview.
69. Wednesday, Aug. 22, 1984 - Andrea completes instructional Flight No. 31.

70. Thursday, Aug. 23, 1984 - Andrea completes instructional Flight No. 32.
71. Friday, Aug. 24, 1984 - thirty-seventh interview.
72. Saturday, Aug. 25, 1984 - Andrea completes instructional Flight No. 33.
73. Saturday, Aug. 25, 1984 - thirty-eighth interview.
74. Friday, Aug. 31, 1984 - Andrea completes instructional Flight No. 34.
75. Friday, Aug. 31, 1984 - thirty-ninth interview.
76. Sunday, Sept. 9, 1984 - Andrea completes instructional Flight No. 35.
77. Monday, Sept. 10, 1984 - fortieth interview.
78. Friday, Sept. 28, 1984 - Andrea completes instructional Flight No. 36.
79. Friday, Sept. 29, 1984 - Andrea completes instructional Flight No. 37.
80. Friday, Sept. 29, 1984 - forty-first interview.
81. Friday, Oct. 5, 1984 - forty-second interview.
82. Saturday, Oct. 6, 1984 - Andrea completes instructional Flight No. 38.
83. Monday, Oct. 8, 1984 - Andrea completes instructional Flight No. 39.
84. Monday, Oct. 8, 1984 - forty-third interview.
85. Saturday, Oct. 13, 1984 - forty-fourth interview.
86. Wednesday, Oct. 17, 1984 - forty-fifth interview.
87. Sunday, Oct. 21, 1984 - forty-sixth interview.
88. Friday, Oct. 26, 1984 - Andrea completes instructional Flight No. 40.

89. Friday, Oct. 26, 1984 - forty-seventh interview.
90. Friday, Nov. 23, 1984 - Andrea completes instructional Flight No. 41.
91. Friday, Nov. 23, 1984 - forty-eighth interview.
92. Sunday, Nov. 25, 1984 - Andrea completes instructional Flight No. 42.
93. Saturday, Dec. 8, 1984 - Andrea completes instructional Flight No. 43.
94. Thursday, Dec. 13, 1984 - Andrea completes instructional Flight No. 44.
95. Friday, Dec. 21, 1984 - forty-ninth interview.
96. Monday, Feb. 18, 1985 - Flight No. 45.
97. Tuesday, Feb. 19, 1985 - Flight No. 46.
98. Thursday, Feb. 21, 1985 - Flight No. 47.
99. Thursday, Feb. 21, 1985 - Flight No. 48.
100. Monday, Feb. 25, 1985 - Flight No. 49.
101. Wednesday, Feb. 27, 1985 - Flight No. 50.
102. Saturday, Mar. 2, 1985 - Flight No. 51.
103. Thursday, Mar. 7, 1985 - Flight No. 52.
104. Friday, Mar. 15, 1985 - Flight No. 53.
105. Friday, Mar. 15, 1985 - Flight No. 54.
106. Saturday, Mar. 16, 1985 - Flight No. 55.
107. Saturday, Mar. 16, 1985 - Flight No. 56.
108. Sunday, Mar. 17, 1985 - Flight No. 57.
109. Saturday, Mar. 23, 1985 - Flight No. 58.
110. Monday, June 10, 1985 - Flight No. 59.
111. Tuesday, June 11, 1985 - Flight No. 60.

- 112. Tuesday, June 11, 1985 - Flight No. 61.
- 113. Wednesday, June 12, 1985 - Flight No. 62.
- 114. Wednesday, June 12, 1985 - Flight No. 63.
- 115. Friday, June 14, 1985 - Flight No. 64.
- 116. Monday, June 17, 1985 - Flight No. 65.
- 117. Monday, June 17, 1985 - Flight No. 66.
- 118. Wednesday, June 19, 1985 - Flight No. 67.
- 119. Wednesday, June 19, 1985 - Flight No. 68.
- 120. Thursday, June 20, 1985 - Flight No. 69.
- 121. Friday, June 21, 1985 - Flight No. 70.
- 122. Friday, June 21, 1985 - Flight No. 71.
- 123. Saturday, June 22, 1985 - Flight No. 72.

Private pilot licence
completed.

APPENDIX 2
INTERVIEWS WITH PILOTS

APPENDIX 2INTERVIEWS WITH PILOTS

1. Baile, Moe -commercial pilot, employed as a licencing inspector with Transport Canada.
2. Bent, Rich -private pilot, employed as a technician.
3. Beye, Alfred -private pilot, employed as CP Air 747 mechanic.
4. Bidell, Jack -commercial pilot, flying club manager.
5. Clarke, Judy -commercial pilot, aviation insurance broker.
6. Clarke, Rick -commercial pilot, PWA employee (agent).
7. Cooper, Madeline -private pilot, retailer.
8. Dawson, Karen -commercial pilot, student/part time instructor.
9. Devine, Diana -commercial pilot, instructor at flying club.
10. Edwards, Robert -private pilot, owner of dental clinic.
11. Elkins, Frank -commercial pilot, charter pilot.
12. Engel, Doug -ex-Navy flight instructor, professor.
13. Enns, John -commercial pilot, accident investigator for Transport Canada.
14. Fletcher, Kathe -commercial pilot, instructor at flying club.
15. Frey, Ulrich -commercial pilot, owner of flying club.
16. Gillman, Tom -private pilot, professional engineer.
17. Gwilliams, Dave -commercial pilot, instructor at flying club.
18. Hackman, Mike -commercial pilot, aircraft broker.
19. Hayko, Pat -commercial pilot, CNR employee.
20. Henley, Irene -commercial pilot, licencing inspector for Transport Canada.
21. Johnson, Bill -commercial pilot, manager of club.

22. Kirk, Garry -commercial pilot, supervisory pilot Air Canada.
23. Kitka, Emile -commercial pilot, warehouse worker.
24. Kushniruk, Dwayne -commercial pilot, aircraft broker.
25. MacDonald, Heather -commercial pilot, accident investigator.
26. Nixon, John -commercial pilot, charter pilot.
27. Ramsey, Bill -private pilot, medical doctor.
28. Reimer, Alf -private pilot, retired retailer.
29. Ribout, Noel -commercial pilot, licencing inspector with Transport Canada.
30. Richter, Wayne -commercial pilot, employed by Air Canada.
31. Risk, Paul -commercial pilot, chief pilot and instructor.
32. Smith, Ian -student pilot, computer technician.
33. Valen, Fred -student pilot, diesel mechanic.
34. Vincent, Marie -commercial pilot, employee of Transport Canada.
35. Wyatt, Henry -commercial pilot, M.D. and professor.

APPENDIX 3

INTERVIEWS WITH SCHOLARS

APPENDIX 3INTERVIEWS WITH SCHOLARS

1. Dr. Ted Aoki
2. Dr. Michael Apple
3. Dr. Larry Beauchamp
4. Dr. Ton Beekman
5. Dr. Robert Burch
6. Dr. Doug Engel
7. Dr. Judith Golec
8. Dr. Madeline Grumet
9. Dr. John Jagodzinski
10. Dr. Margaret Hunsberger
11. Dr. Ken Jacknicke
12. Dr. Heidi Kass
13. Dr. Janice Ramsey
14. Dr. Peter Rothe
15. Dr. Val Suransky
16. Dr. Max van Manen

APPENDIX 4

SAMPLE INTERVIEW

APPENDIX 4SAMPLE INTERVIEW

C: Well what I am hoping to do is memorize the pre-landing check list and so that I won't have to be looking down at the sheet and trying to keep everything steady at the same time and uh concentrate on flying it and get the rest of it out of the way; in fact I might try to start doing it before I get to the approach you see he was getting a bit worried at the approach and maybe if I do it in the first segment it might be better.

N: Does he do a downwind check then, does he do his pre-landing and downwind at all over the runway or anything at all that is normally what I would do.

C: Well no, lets see, no, we were doing that on the approach.

N: Well that is kind of pushing it.

C: Yeah, well I thought so, but then I mean I don't have any basis.

N: Yeah, well usually you have a downwind it would be a great in when I start in on

C: Yeah see that is even further back than I was thinking it was thinking basic, you know.

N: Start slowing it down.

C: Yeah see this is it the airspeed should be pretty well steady by the time you even start the approach and at that point I was trying to steady the airspeed during the approach, steady the glide path, lose altitude at a constant rate of speed.

N: Yeah

C: Do a pre-landing check and so I suppose you can appreciate it.

N: Yeah

C: I tried to remain as calm as possible but it wasn't until that I was just right over the runway that I did get that panicky feeling then.

- N: Yeah. I guess it is I think there is a tremendous amount of information coming to you when you are flying.
- C: That is it it is an overload when you are doing circuits you want to make sure that you get on each lane properly, you don't want to turn too steeply because you know you have to make sure that your turn you know or just in front of you know so that is a consideration. I can usually turn 30 degrees you know I just can't turn and know that it is 15 degrees and then maintain your altitude and course until it comes time to start losing altitude you know knowing exactly when to turn on to *base* leg you know when to turn to the approach you know. —
- N: When do, do you use any cues for turning onto *base* leg from downwind.
- C: Well I sort of look over and sort of start flying along parrallel to the runway and I figure well there is a fair distance you know and I try to and I can't estimate the distance that well you know there are power lines and cut lines and stuff like that so I just let a few a couple of them go by and it looks like it is a reasonable distance then I just turn then and that seems to be fine and then I turn to the approach when I it looks like I am even with the runway you know and then I make a left turn or a right turn and go right down that way, that way seems usually what seems to be happening with that.
- N: So he hasn't given you any cues about looking off into the interior when you see the runway just ahead and you then turn?
- C: No, no I don't think he wanted to.
- N: He probably will.
- C: Yeah, he will probably tell me later.
- N: ~~It will be easier with that cue~~ when you can just see the runway pass by ahead you can usually turn pretty easily.

- C: So I didn't have to worry about anything, the power was off and then
- N: Did you maintain a certain air speed on descent? Did you talk about that?
- C: Yeah, he talked about maintaining 75 knots and then when I come close to the point where I have to touch then he tells me to pull back on the nose and well to bring the nose up and he tells me I really don't know how much to do at this point and it usually lands pretty hard you know it, I manage to get slowed down enough to put the nose down.
- N: How much flaps do you use
- C: None.
- N: No flaps at all? O.K. I am really interested in knowing or if you are aware or are becoming aware of the distance from the ground and how you are deciding when to pull back?
- C: I don't think I have to much awareness of that right now. I am busy making sure my airspeed doesn't decrease or anything, make sure my level of decent is proper, that my nose isn't too high or too low, that my glide path is right you know that the power is right and should the airspeed change suddenly he would expect me to change the power on that aircraft because that is pretty well the only way you can get it down at that point and I am so busy doing all these things you know that it hasn't all come together yet you know.
- N: So you're focussing on.....
- C: I am trying to focus on the end of the runway when we start coming down just getting ready to settle over the runway I try to look as far away as I can for the first little while because then the ground doesn't move so fast and then sort of get an idea but the thing is that you don't have that much time so I just need more practice.

APPENDIX 5

EXAMPLE OF FIELD NOTES

APPENDIX 5EXAMPLE OF FIELD NOTESInterview With Government OfficialComments/InterpretationsDescription

Thur. Oct. 4, 1984 - 2:30 p.m.

- Interview with B.
- A = me.
- C - another gov't, official
- D - " " "

Space:

- an open area office space
- very cramped, tacky decor
- piles of paper everywhere
- C & D seem to be "trapped in their areas; forced to listen but unable to participate.

I feel somewhat intimidated by this huge man. I've heard stories about him before I arrived at his office.

I did not debate the issue!

Not surprised to hear the word discipline.

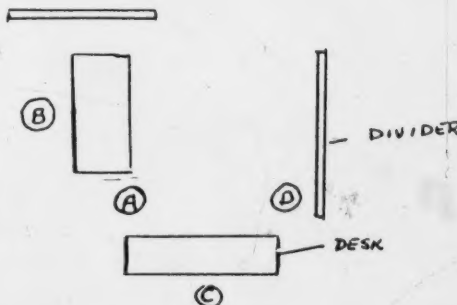
How do you learn your limitations?

I made the correct assumption.

Will the recreational pilot put up with that kind of stress?

This is a good point provided that finding out your breaking point doesn't cause you to quit flying out of fear.

What can we learn from the military flight training as it is conducted today?

Description of B:

- big, big man!
- looks "military" (short hair)
- aggressive/assertive.
- loud voice
- is boss of C & D.

B did not want to be tape-recorded

Topic: Student Pilots:

- "flying requires self-discipline knowledge, and skill."

- "pilots must come to realize their own limitations."

- "When I was in the military..."

- "Instructors have to push students to the breaking point."

- "It is better to find out your breaking point before training than after."

- "I learned in the military 20 years ago. For years the military served as the pipeline for new instructors."

Why are there no real measures taken to screen potentially dangerous pilots?

How many accidents can be traced to this fact?

Not sure about this.

So why doesn't Transport Canada overhaul it?

Does this mean they would be more competent?

Is flight instruction a profession?
Who can control/evaluate this?

This is hard to believe!

Why are they making so many poor judgements - training?

Does this mean that 85% of pilots will do a good - average job of flying?

Why? Other areas of curriculum change take years not decades!

Get them out!

Why? Who is teaching them?
Other instructors who haven't known how to instruct for a longer time?

- Student Pilots:

- "should be screened but there are problems associated with this:
 1. expense.
 2. human rights.
 3. reliability of screening tool.

"Many pilots get into aircraft that are beyond their abilities to fly."

"We can enforce moral responsibility."

"Private training needs an overhaul"

- more hours to get licence.
- instrument training.
- systems are more complex today.

Re: Flight Instructors:

- "It should be more difficult to become a flight instructor."

- "Instructors must act as professionals"

- "They shouldn't be allowed to progress if they don't do their jobs properly."

- Topic: Accidents:

- The FAA says proficiency check rides do not improve safety."

- "75% of fatal accidents are caused by poor pilot judgement."

- "10 - 15% of instructors do a good job of instructing - 85% do a good average job."

- "It took 30 years for our present situation of flight training to develop so it will take a long time for change."

- "We have a large number of nominally qualified instructors."

- "Most do not know how to instruct"

The military metaphor.

There may be some merit in some of these ideas but once again would students put up with this?

Question?

When do you become a pilot?

Conclusions:

I think he has many good ideas and really cares what happens to pilots.

I sense his frustration in working within government restraints.

He would be a tough instructor but I think he would be the kind of person I would like to learn a skill like flying from.

- "Instructors should be like policemen"

- "don't be too well liked"

- "a little bit demanding"

- "work within guidelines"

- " know minimum standards"

"You become a pilot on the day you have the mechanical skills required to manipulate the aircraft, have gained the knowledge of how and why flight occurs and have developed the judgement to know when to use them."

- Further discussion of military versus public training of pilots.

APPENDIX 6

SAMPLE OF JOURNAL ENTRIES

APPENDIX 6

SAMPLE OF JOURNAL ENTREES

Tuesday May 29/64

- Walking in li 11:50 am

* but idea of checking
out the continuum of

a) (categories of pilots) and

b) possibly have certain
qualities change their
time / sequence- Check of instructor
and pilot and knowledge

June 12/64

Why is it?

1) must start examining
everyday activities
"discovery of life"2) Review from other
view of pedagogy

3) Love birds

4) becoming a change
process of becoming

5) found birds

6) thoughts for pages

7) Extension of human
experience

8) Degree of understanding

9) getting understanding
of self

June 12/64

June 12/64

- Flying steps

that healthy respect
for the inconstant- make you
aware of your

- understanding

1) Theme of time

and you have
an experience theme* Can actually see
experience in time
by flying ahead of
yourself like pre-
ceding a look
(physically)

→ have seen this over

Thank

Thank

Thank
Spaul
Thank

Oct. 13/84

In order to put
the kind of effort
in to a study of
this nature — one
must be passionate
enraptured.

Friday Oct. 19
Waz, Li sic
children cranes
- Grant Notley
Killed
(am writing
proposal)

Friday Nov 7/84

Ed. Del. R. Port. 6:45

Riddle:

① An ethical question
has arisen re:
importance of flying
with birds — I shall
try to say what I
found
"Alberta Tiggers"

②

③ The first deal with
about 25 C. —
must return the
money?
→ I think I
will Riddle?

MARCH 14-1985

① *ILLUSIONS

(Thought about the
at 4:00 am. —
couldn't get to
sleep)

② The revelation
of reality — reality

Mon-March-25/85

- Themes:

Come up with
list of 8 themes —
is this the way
to go?

Mon. Apr. 23/85

① Flying →

being able to handle
stress → to never

get excited →

keep the situation
in contact all the
time. No.

June 14/84

- ① The study would
signify the interpretation
of average people. The
assumption being to
show traditional
pedagogic situations.
The rationale being
we must share.
If pedagogy is lost
practiced in a
shared sense - we
should take care
skills and try
apply them in a
shared sense.
I am not doing this
above the common
sense everyday
reality of children.

June 14/84

- ① Address The general
emergence of
themselves.
- ② "If it means
anything it means
nothing" - Hume.
- ③ Address - what
happened to us?
- my own history.
- ④ The League Human
through language.
- ⑤ Must write an
essay that
knowledge can be
shared.
- ⑥ Nation of text,
dialogue.

October 2, 1984 - Tuesday

- ① Spoke to Maria Vignot
- interested in study.
- her husband fly.
- said to talk to
- Neal Ribaut
- Mrs. Balle
- ② Phoned Mr. Dick:
- not in - will be
in tomorrow.
- ③ Phoned Mr. Howard:
- spoke to Mr. Howard
- let him talk.
- ④ Phoned June Hosley:
- will visit her
Wed. Oct. 10/84.
- ⑤ Rayne K. @ 4:45 Thru.
- ⑥ Tom Howard - talked to

Oct. 8/84

11:30 am.

Baking leaves.

- ① Maybe it is naive
to think we can
describe the personal
dimensions of anything.
- ② All we can hope
is that a cliffing
perspective will help
open up new
thoughts - new
ways of seeing.
- eyes in a new
light as Art says.
- ③ How I came to
the proposal.
- write up the
history of the proposal.

Sunday July 8, 1984

- (free phone @ 10:30 am)
- she had returned from the museum
- used 5.10.10.10 AD and 26.10.10
- did 6. To be at 10
- not a bit upset
- limited behavior, a big one - a bit less class but saved it.

July - 1984

Pilots - machine

(2) - ship -

(3) - made a dancing report

(4) -

-> same for machine

-> all encompassing.

Additives

-> have felt a mental

-> can relate to machines

-> self - out and

Flying a machine a time

-> issue of machinery

- control

- control

- "normal" feeling

June 14/84

- Stressor organized

skills

- Barrenness

- Phys Ed background

-> acquisition of skills

-> dance - feeling about

-> relationships

-> space and success.

-> remains -

time dimensions.

-> relationship - one

to equipment.

-> cognitive/psychomotor

afterwards domains

of stimulated.

April 23/84

The flight test is not the final test

- staying here is

We are constantly

being evaluated by

nature and technology.

April 25/54

The flight test
is not the final test
- staying alive in
we are constantly
being evaluated by
nature and technology.

May 10/54

Blondette:

Theme of the
book "changed"
the way I experienced
flying would not.
Like the A-10 engine
i.e. auditory sense
was dulled i.e.
was not as stressed
in the engine.

Philosophy:

How flying affects
man's mind.

- sense of exposure
- can this be
be overcome - how?
- is it necessary for
flight experience to be
shared?

- How the exposure
has to be shared to
be fulfilling?

May 23

(1) Burch in his paper
p. 12 - talks about the
enchantment w. tech.
- Could this be
applied to thesis?

(2) also

life of man p. 17-

(3) Hidden Consciousness?

Sunday May 27

Overflight instruments

don't make judgments,

they simply calculate.

(p. 56 - Burch)

July p. 24 - no more

thing as a conscious
subject independent of
its exposure of the
world.

APPENDIX 7

EXAMPLE OF STAGE ONE OF DATA ANALYSIS

APPENDIX 7

EXAMPLE OF STAGE ONE OF DATA ANALYSIS

NEIL: When they told you to go - did you question it at all?

CHER: No - he asked me if I was ready, and I said "well, yes."

He said "yes, you're ready - go ahead, have fun - don't rush" and he radioed the tower and told them that it was my first solo so they were quite well aware of that. So

I went out and did my run up and I think I was nervous

taking off, or something like that, so that gave me a lot

of time to collect myself and by the time I called the

tower and told them I was ready for take-off. I was ready -

and so all I decided I wasn't going to think about anything

except what I was doing at the particular moment. I was

not going to let any extra thoughts float in at all. I

wasn't going to think about landing until I was landing, was

and that worked very well. And I was just as cool and she really?

calm as you wouldn't believe. I can't believe it myself

after I think about it. Everything went perfect, no pro-

blems at all. Except when I called down and they said I

was number four to land and I wasn't using that wide a

circuit, so I just made a left hand turn and widened out.

I thought I might as well let all these A.C. get out of

the way and so I took a nice long approach and came down

and just greased it on. It was just perfect. In fact I

couldn't even tell that I was on till I heard the squeak -

that was how smooth it was, and it was 20 knots by that

time - the wind. Then I was so excited. I was like this -

from ear to ear grinning. Then I switched over to ground

frequency to ask for taxi clearance - and they cleared me.

"dream-like
experience?"

TIME
THINKING

Control
of inhibitory
stimuli

The
success of
the flight is
evaluated by
the landing

Most
students say
this about
1st solo -
"best
landing"

APPENDIX 8

INTERVIEWS WITH EDITORIAL COMMENTS

APPENDIX 8
INTERVIEWS WITH EDITORIAL COMMENTS

NEIL: So why do they say "You can take the pilot out of the bush but you can't take the bush out of the pilot?"

* [Comment:
What is "the bush" anyway?]

HEATHER: But they also say, "You can make a .. instrument pilot out of a bush pilot, but you can't make a bush pilot out of an instrument pilot."

NEIL: I flew up North also so I have some sense of what you are talking about. They had a lot of accidents too though. They had to know how to survive because they wrote off so many planes.

HEATHER: Yes, but the accident level will increase depending on the circumstances. There are a lot of helicopter accidents too but look where helicopters are flying. You're flying in and out of international airports all the time. You've always got fuel stops, controllers

. . . you go out in the middle of nowhere and your chances of having an accident increase dramatically. Those people are the people I admire the most, they're the people I felt I could learn the most from about flying.

* [Comment:

Is the inference here made that bush pilots would be the most desirable instructors?]

The guys doing that kind of flying did not seem to have the kind of inflated "show off the stripes on your shoulder" attitude that a lot of pilots who envision themselves as Air Canada captains, seem to have.

* [Comment: how much of flying is just an ego trip?]

I think that just being more down to earth and seeing themselves as doing the job they are doing rather than dreaming that . . . I think that's got a lot to do with it.

* [Comment:

What impact does displaying one's skills before the public (and colleagues) eyes have on one's attitude towards the occupation. The Lear pilot is "just doing his job" but in a sense is putting on a bit of a "performance" before an "audience" as he pulls up to the terminal. The rewards of a "Lear job" are partly extrinsic (it looks cool) whereas the rewards of a bush job are more intrinsic ("I feel good about that flight", "I provide a needed service", etc.) Does this make sense to you? The performances take place on different

APPENDIX 9

EXAMPLE OF STAGE TWO OF DATA ANALYSIS

APPENDIX 9

EXAMPLE OF STAGE TWO OF DATA ANALYSIS

NEIL: What would make you quit or abort the take-off? TIME

CHER: Yes, okay. Well, if I found that the engine RPMs weren't TEXT POWER
 enough - if something was wrong with the power - I definitely would abort. STOP TIME TEXT

NEIL: How would you determine that?

CHER: Well, first of all I would notice by the sound of the en- SOUND
gine. Then of course I'd look over at the gauge and if TECHN.
 it wasn't high enough - if it didn't seem - I'd first
check the mixture. If I had for some reason forgotten to ENGINE
 make it - to put on - to rich enough then I would do that.
 If that happened, or if anything went wrong with anything
in the plane - I don't know specifics - if just anything
 didn't seem right, then I probably would abort. I would RADIO
immediately radio the tower and tell them - I would turn TURN
back. OTHERS

NEIL: If you were trying to . . . (reliance)

CHER: Or if I blew a tire or something. SENSATION

NEIL: If you were trying to take off, at what point - and it was TIME
 refusing to fly - at what point would you say "this is long
enough" or "I've gone far enough and I don't want to proceed

APPENDIX 10

COLLECTION AND CATEGORIZATION OF DESCRIPTORS

APPENDIX 10
COLLECTION AND CATEGORIZATION OF DESCRIPTORS

COLLECTION

1. ADDICTION	26. CRITICAL POINTS	51. GENDER	76. NATURAL
2. AESTHETICS	27. CUES	52. GOD	77. NATURE
3. AGE	28. DAY DREAMS	53. HABITS	78. NON-PILOTS
4. AIR	29. DANGER	54. HEIGHT	79. OBSESSION
5. ALONE	30. DEATH	55. HIGH	80. ORIENTATION
6. ARTIFACTS	31. DECEPTION	56. HUMANIZATION	81. OTHERS
7. ATTITUDE	32. DESIRE	57. HORIZON	82. PANIC
8. BECKONING	33. DISPLAY	58. ILLUSION	83. PATTERNS
9. BECOMING	34. DISTANCE	59. INDEPENDENCE	84. PATHWAYS
10. BIRDMAN	35. DRESS	60. INSTRUMENTS	85. PERFECTIONIST
11. BIRDS	36. EGO TRIP	61. INTRODUCTION	86. POWERS
12. BLURRED HORIZONS	37. ENCHANTMENT	62. INSTRUCTOR	87. PREDICTABILITY
13. BUREAUCRACY	38. ENGINE FAILURE	63. JARGON	88. PREPARATION
14. BUSH PILOTS	39. EVALUATION	64. JOY	89. PRESSURE
15. CALM	40. EXTENSION OF..	65. LANDING	90. PASSENGER
16. CHALLENGE	41. FEAR	66. LIGHT	91. RADIO
17. CLOUD	42. FINALITY	67. LIKE...	92. RAIN
18. COLOR	43. FINGER TIP	68. LIMITS	93. RELATIONSHIPS
19. COMPLACENCY	44. FLOATING	69. LOST	94. RELAXATION
20. CONRADSHIP	45. FLOW	70. LOVE	95. RITUAL
21. CONFIDENCE	46. FORCE	71. MAGIC	96. RISK
22. CONTROL	47. FREEDOM	72. MAPS	97. ROTATION
23. CONTRAST	48. FREQUENCY	73. MONEY	98. ROUTINE
24. "COOL"	49. FRUSTRATION	74. MOVEMENT	99. ROUTINIZATION
25. CRASH	50. GADGETRY	75. MOOD	100. ROMANCE
101. RUNWAYS	118. TALK ABOUT...	135. WORK	
102. SACRIFICE	119. TAKE - OFF	136. WHY FLY? (april 5/85)	
103. SEARCH	120. TEACHING	137. HEROES	
104. SEASON	121. TENSE	138. ATTRACTIVENESS	
105. SELF	122. TESTING	139. DYNAMIC	
106. SENSATIONS	123. TECHNOLOGY	140. STORY TELLING	
107. SKILL	124. TEMPERATURE	141. ORDINARY	
108. SHELL	125. TEXT	142. SURVIVAL	
109. SMOOTH	126. TIME	143. CHANGE	
110. SNOW	127. TOWER	144. DIALOGUE	
111. SOLITUDE	128. TOUCH	145. SENSITIVE	
112. SOUNDS	129. TRUST	146. SIMPLE	
113. SOLO	130. TYPE	147. OPTIONS	
114. SPACE	131. UNIQUE	148. ALTERNATIVES	
115. SPEED	132. WEIGHT		
116. STRENGTH	133. WEATHER		
117. SUN	134. WIND		

CATEGORIZATION SCHEME No. 1ENVIRONMENT DESCRIPTORS

Nature
Natural
Light (day)
Season
Sun
Cloud
Air
Rain
Temperature
Wind
Calm
Weather
Birds
Horizon
Distance
Space

MECHANICAL DESCRIPTORS

Technology
Jargon
Gadgetry
Instruments
Display
Artifacts
Radio
Maps
Runways
Tower
Dress

POSITIVE EMOTION DESCRIPTORS

Love
Joy
Enchantment
Romance
Desire
Beckoning
Trust
Strength

SPECIFICATION DESCRIPTORS

Weight
Speed
Time
Frequency
Force
Critical Points
Limits

TECHNICAL DESCRIPTORS

Preparation
Orientation
Take-offs
Rotation
Patterns
Pathways
Landing

NEGATIVE EMOTION DESCRIPTORS

Frustration
Fear
Tense
Pressure
Panic
Quit

SENSATION DESCRIPTORS

Aesthetics
Movement
Sensations
Smell
Sounds
Touch
Smooth
Fingertip
Color
Flow
Floating
Height
Contrast

RELATIONSHIP DESCRIPTORS

Alone
Self
Solo
Solitude
Comradship
Relationships
Others
Passenger
Talk About . . .

MENTAL STATE DESCRIPTORS

Becoming
"Cool"
Ego Trip
"High"
Addiction
Obsession
Why Fly
Independence
Control
Challenge
Powers
Unique
Extension of . . .
Freedom
Relaxation
Complacency
Confidence
Attitude
Mood
Work/Play

MORTALITY DESCRIPTORS

Risk
Danger
Sacrifice
Engine Failure
Lost
Crash
Death
Finality
Search

ROUTINIZATION DESCRIPTORS

Predictability
Ritual
Routinization
Routine
Habits
Cues

PILOT CHARACTERISTIC DESCRIPTORS

Type
Gender
Age
Perfectionist
Skill
Bush pilot
Non-pilot

TRAINING DESCRIPTORS

Bureaucracy
Introduction
Instructor
Teaching
Text
Testing
Evaluation
Money

FANTASY DESCRIPTORS

Blurred Horizons
Birdman
Day Dreams
Deception
Illusions
Magic
God
Humanization
Like . . .

CATEGORIZATION SCHEME No. 2

AFFECTIONS

I. Affections in general:

- calm
- sensitivity

II. Personal Affections:

- pleasure
- enchantment
- attractiveness
- beauty
- natural (simplicity)
- fear
- desire
- panic
- bush pilot (courage)
- heroes (repute)
- "cool"
- complacency
- ritual

III. Sympathetic Affections:

- love
- sacrifice
- magic (sorcery)

VOLITION

I. Individual Volition:

- alternatives
- options
- habits
- risk (chance)
- quit
- trappings
- instrument
- engine failure
- critical points
- perfectionist
- danger
- preparation
- work
- control
- instruction
- skill
- technology
- gadgetry
- smooth

- challenge
- finality
- frustration
- ordinary

II. Intersocial Volition:

- bureaucracy
- freedom
- independence
- addiction
- personal relations
- money

WORDS RELATING TO SPACE

I. Space in General:

- space

II. Dimensions:

- horizon
- distance
- height
- "high"
- tower
- dress
- landmarks
- limits

III. Form:

- attitude

IV. Motion:

- flow (motion)
- movement
- passenger
- speed
- dynamic
- crash
- pathways
- runways
- landing
- takeoff
- rotation

ABSTRACT RELATIONS

- I. Existence:
 - mood (state)
- II. Relation:
 - relationships
 - contrast
 - others
 - patterns
- III. Quantity:
 - extension of
 - non-pilots
 - relaxation
- IV. Order:
 - routine
 - routinization
 - introduction
 - type
 - gender
 - unique
- V. Time:
 - season
 - time
 - age
 - frequency
- VI. Member:
 - alone
- VII. Change:
 - change
 - survival
 - stop
 - becoming
- VIII. Causation:
 - why fly?
 - dynamic
 - athletics
 - force
 - crash
 - strength
 - powers

MATTER

- I. Existence:
 - ego
 - nature (world)
 - sun
 - pressure (gravity)
 - weight
 - floating
 - light
- II. Inorganic Matter:
 - tense
 - air
 - weather
 - rain
 - wind
 - cloud
- III. Organic Matter:
 - 1. Vitality:
 - man/woman
 - death
 - birds
 - 2. Sensations:
 - touch
 - heat
 - odor
 - sounds
 - light
- IV. Intellect:
 - 1. Formation of Ideas:
 - search
 - evaluate
 - testing
 - confidence
 - trust
 - jargon
 - birdman
 - predictable
 - day dreams
 - blurred horizons
 - romance
 - 2. Communication of Ideas:
 - like.. (metaphors)
 - display

CATEGORIZATION SCHEME No. 3

- I. FLYING AS A PUBLIC SPECTACLE (display)
- II. THE PILOT'S TEXT
 - Formation of Ideas
 - Communication of Ideas
 - Means of Communication
- III. THE FLYING MACHINE
- IV. THE SKY
- V. SPACE AWARENESS
 - The cockpit space
 - The Airplane space
 - Ground space
 - Air (flight) space
 - Dimensions
 - Movement into space
 - The Take Off (departure) (the climb)
 - Straight and Level
 - Turns
 - The Landing (arrivals) (descent)
- VI. FLYING SENSATIONS
 - Light
 - vision
 - color
 - Sounds
 - Odor
 - Heat
 - Touch
- VII. THE PILOTS EXPERIENCE OF TIME
- VIII. THE PURSUIT OF FREEDOM AND AVOIDANCE OF DEATH
 - Choice
 - Risk taking
 - Death
 - Control by others
- IX. AFFECTIONS
 - Personal
 - Sympathetic
 - Moral
 - Religious
- X. Flying Memories

CATEGORIZATION SCHEME No. 4CHAPTER I - FLYING AS A PUBLIC DISPLAY

1. Flying perceived as a last frontier
2. The Mystique of the Bush Pilots
3. "Pushing the Envelope" with a fighter pilot
4. "I knew a lot of people who flew"
5. The jargon of flying
6. Flying is a public performance
7. "Computerized fancy little machines"
8. Flying is like . . .
9. The pilot's image of other pilots
10. Being a passenger in a light aircraft
11. "There would be nothing more ridiculous than a woman learning to fly!"

CHAPTER II - THE PILOT'S TEXT

1. The student's perception of the instructor
2. Instructor's perception of students
3. Interpreting symbols
4. Instinct, Intuition, Innate drives, The Natural

CHAPTER III - THE FLYING MACHINE

1. The Impact of Technology
2. Reliability and Redundancy
3. Control Inputs
4. The Person-Machine Relationship
5. Concentration through Relaxation

CHAPTER IV - THE SKY

1. The Attraction of Open Spaces
2. The Wind
3. The Clouds
4. Turbulence and Vortex
5. Storms

CHAPTER V - SPACE AWARENESS

1. Cockpit Space
2. Aircraft Space
3. Ground Space

- 4. Flight Space
 - A) Dimensions
 - i) Three Dimensional Space
 - ii) Verticality
 - iii) Landmarks
 - iv) Being Lost
 - v) Distance
 - vi) Speed
 - B) Movement in Space - Flight
 - i) Sharing Space
 - ii) Routines in Flight
 - iii) Pathways in Space
 - iv) Preparation for Flight
 - v) The Take Off
 - vi) Level Flight
 - vii) Turn
 - viii) Landing
 - ix) The Solo

CHAPTER VI - SENSATIONS

- 1. Vision
- 2. Touch
- 3. Sound
- 4. Odor

CHAPTER VII - TIME

- 1. Time and the Pilot
 - A) Time You First Encountered Flying
 - B) Age of the Student
 - C) Time it takes to Learn a New Skill
 - D) Frequency of Lessons
 - E) Plateaus of Learning
 - F) Time to Solo
 - G) Time it takes to Complete Your Licence
 - H) Future Time
 - I) Time to Die
- 2. The Course of Time
 - A) Day and Night
 - B) Time of Year
 - C) Wait for Weather
- 3. Logging Time
 - A) Air Time
 - B) Flight Time
 - C) Pilot in Command Time
 - D) Dual Time
- 4. Time in Motion
 - A) The Take Off Roll
 - B) "Time Flys By"

- C) Time Limit - Fuel Supply
- D) Time to Think in Advance
- E) Time to Prepare to Land
- F) Time to Flair

CHAPTER VIII - THE PURSUIT OF FREEDOM

1. Individual Volition
 - A) Am I Responsible?
 - B) Do I Know my Limitations?
 - C) Am I Critical Enough of my Own Flying Skills?
 - D) Am I Fit to Fly?
 - E) Am I Ready to Solo?
 - F) Should I Quit?
 - G) When do I First Become a Pilot?
 - H) Do I Wish to Share this Experience?
2. The Influence of Others
 - A) Friends and Colleagues
 - B) Family
 - C) Other Pilots
 - D) Fighter Pilots
3. Air Traffic Control
4. Money
5. Risk
6. Fear
7. The Crash
 - A) Engine Failure
 - B) Rationalization of the Deaths of Other Pilots
 - C) Cheri's Thoughts on Crashing
 - D) Parson's Crash
 - E) Jones Crash
 - F) Wapiti Crash
 - G) Judy's Crash
 - H) An Accident Investigator's Thoughts

CHAPTER IX - AFFECTIONS

1. Personal Affections
2. Sympathetic Affections
3. Religious Affections

CHAPTER X - FLYING MEMORIES